THE
MEDICAL ANNUAL

A YEAR BOOK OF TREATMENT AND PRACTITIONER'S INDEX.

FORTY-SEVENTH YEAR
1929

INDIA: BUTTERWORTH & CO. (INDIA) LTD.

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THE MEDICAL ANNUAL, 1929

A Review of the Year's Work in the Treatment of Disease.

INTRODUCTION

BY THE EDITORS.

If we were asked to say in what way this volume of the Medical Annual differed from its predecessors of thirty years ago, one change that we should stress would be the enlarging area of radiotherapeutics. The new conceptions of matter and energy that have emerged from the experimental physics of that period have, one might almost say, applied themselves to the treatment of disease. Indeed, the exuberance of this process has certain embarrassing aspects. We are warned, for example, in the article on phototherapy that much of the 'artificial sunlight' on the market is incapable of furnishing any of those bactericidal rays which give to natural sunlight much of its therapeutic value. But the same is true of almost any new method of treatment. At first it is grossly overpraised, and this leads in turn to a 'negative phase' of relative unpopularity. Then the methods of and indications for its use are appraised, and when at length it issues from its forty years in the wilderness, it is fit for the appointed task. The use of radium is an example of this return to favour after a period of comparative neglect. On the surgical side we believe that the outstanding feature of the year's literature and practice is the advance in radium therapy for cancer, and especially the use of small doses for a long time, for uterine and for mouth cancers. It seems likely that, in many cases which would previously have been treated by excision, radium gives better results.

When we thus emphasize the increasing place in therapeutics claimed by various forms of radiant energy, it must not be thought that we ignore the value of humbler remedies. This 1929 volume is full of suggestions as to the treatment of every-day diseases. For example, we are reminded of the value of hydrochloric ~~acid given~~ internally to patients with ~~acne rosacea.~~ A new drug, tolysin, is advocated for the treatment of rheumatic carditis in childhood. In severe cases of pneumonia it is said that sodium chloride, given either by mouth or by injection, may be of great value. Pituitrin, when needed by women in labour, is effective when given through ~~the nose.~~ The diuretic action of novasurol is enhanced if ammonium chloride is given concurrently. The bleeding of hæmophilia is said to be arrested if fresh human blood be applied to the bleeding area on cotton-wool after the removal of clots. In the treatment of hæmorrhage in jaundiced patients we are advised to reinforce the action of calcium by giving parathyroid extract with it. The value of gelatin as food in the treatment of hæmatemesis is noted. Intravenous injections of sodium salicylate are recommended for the treatment of epidemic encephalitis in its acute stage. In acute poliomyelitis a serum prepared from the blood of convalescent patients, if given early, reduces the mortality and the incidence of serious paralysis. Some inject it into a vein, others into the spinal canal. The itching of eczema in childhood is said to be relieved by injections of epinephrin. In asthma ephedrine exerts a longer effect than epinephrin does, while that of the latter may be prolonged if the site of the injection be massaged. In a valuable review of the treatment of enuresis we learn that no drug has yet displaced belladonna.

Among many interesting observations on blood-pressure will be found a challenge to the usual doctrine that a meat diet sends up the pressure; a note on the value of veratrine as a depressor; and a description of postural hypotension which will interest many readers. Our knowledge of the syndrome of coronary thrombosis has been enriched by electrocardiographic observations which show that certain characteristic changes are seen in the curves taken after this disaster has occurred. Pneumococcic meningitis, it is said, may occasionally recover under treatment by repeated puncture, cisternal or spinal, with cisternal or intravenous injection of antipneumococcic serum. The relations of pregnancy to cardiac and to mental disease are discussed under the appropriate headings. A treatment of obesity by dextrose, with a diet low in protein and fat, is commended. The value of hypertonic saline solutions, given by mouth, rectum, or vein, in reducing intracranial pressure, especially in cases of head injury, is discussed. For the treatment of serum sickness injection of the patient's own blood is recommended. We note also some interesting observations on the decrease in administration of alcohol in acute infections. In diphtheria, for example, the hospital that uses no alcohol has the lowest mortality.

The two great therapeutic discoveries of recent decades—insulin for diabetes and liver substance for pernicious anæmia—are further discussed. It appears that unless the liver treatment is maintained relapses are liable to occur; and the central nervous lesions of pernicious anæmia are generally not relieved, though some observers report success. For the malarial treatment of dementia paralytica it is claimed that a substantial remission of symptoms is secured in many cases; but the liver is appreciably damaged in the process, and there are other drawbacks.

One or two observations of less directly therapeutic value are nevertheless worthy of note, because of their indirect bearing on treatment. A point of this kind is that an underlying syphilitic infection may delay the resolution of the pneumonic lung. The possible influence of this on treatment is obvious. Another example of a new fact with an indirect bearing on treatment is the finding of a positive indirect van den Bergh reaction in the blood serum in cases of cerebral hæmorrhage. This is less likely to occur in the presence of cerebral thrombosis. In this connection we note a new term, 'hypertensive encephalopathy', which connotes a clinical entity the recognition of which may serve to direct treatment successfully.

The ovary, it is suggested, secretes three hormones. The first, œstrin, promotes fertilization and conception; the second, derived from the corpus luteum, provides for the retention of the fertilized ovum within the uterus ; the third or interstitial hormone is concerned with initiating parturition. So far, however, the application of these principles to clinical practice has proved disappointing. The same tantalizing elusiveness is apparent even in the thyroid group of diseases, where endocrinology has achieved its most signal triumph ; for even here we are as yet without a clear notion of the relationship that obviously exists between thyrotoxicosis and iodine intake.

An interesting list of very diverse substances and processes of manufacture which are alike in their capacity for exciting dermatitis iodized oil, linseed oil, chromium plating, stages in the making of rubber, horn-rimmed spectacles, quinine suppositories – serves to remind us that new times bring not only new customs but also new diseases. Possibly carcinoma of the lung is on the increase, and it is even suggested that some of the so-called mediastinal lymphosarcomata are really carcinomata arising from the bronchi.

A good account will be found of the surgery of the tropics, which we believe will be read with interest by many who never expect to practise out of this country. Other tropical subjects of interest are the remarkable reduction in the mortality of relapsing fever under treatment by novarsenobenzol ; the value of certain newer arsenical compounds in the treatment of trypanosomiasis ; and the injection of hot saline solution into the intestinal tract as a cure for ankylostomiasis. Plague patients, even if moribund, may, it is said, be saved by injection of the specific serum, given first into a vein, then later under the skin. The failures of quinine in malaria are, we are told, often due to defects in dispensing.

In the articles dealing with general surgery, a description will be found of the modern treatment of suppurative arthritis. It is pointed out that a branchial cyst may be distinguished from other cystic swellings of the neck because the fluid withdrawn by a needle contains cholesterin. Avulsion of the phrenic nerve, and resection of part of the first rib, are recommended in the treatment of certain cases of pulmonary tuberculosis, in order to secure collapse. Tumours of the chest are being explored and removed nowadays by several surgeons. To avoid the well-known dangers to life of a carbuncle of the lip, ligature of the angular vein under novocain is advised. A diathermy knife has been invented for treating cancer of the œsophagus. The indications for Leriche's periarterial sympathectomy are being widened, and certain chronic bone and joint disorders, and Volkmann's ischæmic contracture, are coming within its range of usefulness. In cases of thrombosing or obliterating arteritis, Leriche advocates excision of a section of the artery, and in some cases removal of one suprarenal. Amputation in senile gangrene may be averted, or reduced in extent, by alcohol injections of the main artery. Post-operative shock may be treated with intravenous injections of dextrose-insulin. The injection treatment of varicose veins has leapt into great favour, and the method is described. Both clinical and experimental evidence agree that better collateral circulation is obtained when the vein is ligatured along with a main artery.

In the section on surgery of children, it is said that a barium enema may give valuable evidence in a case of suspected intussusception. Some chemical solutions are well spoken of for injection into cold abscesses.

The surgery of nervous diseases continues to be fruitful in new methods of treatment. It is claimed that post-traumatic headache can be relieved by injecting air through a lumbar-puncture needle. The facial nerve has been successfully repaired within the petrous bone. It is possible to spare the ophthalmic fibres in dividing the sensory root of the fifth nerve for trigeminal neuralgia. Section of the spinothalamic tract of the cord for the relief of pain is feasible, and gives good results. In cases of intracranial complications of ear disease, cisternal puncture is gaining favour instead of lumbar puncture. There is a good article on the diagnosis of brain abscesses.

A very useful incision for opening the upper abdomen is described by Sloan; it is probably the best we have for the avoidance of incisional hernia and adhesions, and the patient seems very comfortable in the post-operative period. Inhalations of carbon dioxide are recommended to stop hiccough. The pathology of gall-bladder diseases has been revised, and it is suggested that the usual order is: hepatitis, direct infection of gall-bladder, blocked absorption therefrom, gall-stones. The technique of cholecystography is still being improved, and we are therefore reaching the stage which is characteristic of all new diagnostic procedures, that of being able to discern what are the variations within the limit of the normal. Heyd describes three types of obscure post-operative disaster in gall-bladder surgery. Some valuable series of end-results are published in cases of gastroduodenal ulcer and cancer. A good technique is described for a gastrostomy that will not close up if the rubber tube is left out. The cause of toxæmia in intestinal obstruction attracts interest, and there are suggestions for relieving it by injections of hypertonic saline, and of human bile. The vexed question of the surgical treatment of visceroptosis is luminously dealt with.

In the section on orthopædic surgery, a method will be found for reconstructing damaged finger-tendon-sheaths by the use of long free grafts. It is found that compression-fracture of the vertebræ may be followed by late spinal paralysis; in young patients a bone-graft may be indicated. There is a good paper on the elusive condition known as sacro-iliac strain.

Cancer of the rectum is often best treated by a combination of surgery and radium. An operation is described for slinging up a prolapsed rectum in the female.

A study of cases of essential hæmaturia shows that as a rule recovery takes place and no further troubles follow, so that it must be independent of either nephritis or growths. It is pointed out that urinary antiseptics are not efficient unless the urine is concentrated. The frequency of reactions after cystoscopy or pyelography, especially in men, is made the text for a discourse on the wisdom of gentleness. The bleeding from a vesical papilloma may be checked, and the growth withered up, by the application of trichloracetic acid through a cystoscope. A good account is given of the technique of transplantation of the ureters into the colon, an operation which has undergone several improvements of late. The approach to the seminal vesicles by way of the perineum is described and recommended.

Coming to diseases of the eye, we are informed how valuable optochin has been in preventing hypopyon. Conical cornea appears to be due to some endocrine disturbance. Evidence is advanced that the tears contain a powerful antiseptic called lysozyme. The advice is given, when making an ophthalmoscopic examination in a myopic, to make him wear his glasses. It is believed that glaucoma is due to swelling of the vitreous on account of increased permeability of the capillaries. Two substances called glaucosans are well spoken of in the treatment of this condition.

The modern treatment of nasal polypi is the subject of a special article. A new disease of the vocal cords, called 'contact ulcer', is figured. Radium treatment for cancer of the larynx has been relatively unsuccessful in the past on account of difficulties of access, and a method of combining radium and surgery by first removing the thyroid cartilage is advocated. The common hæmatoma of the auricle is best treated by aspiration. Details are given of the diathermy treatment of middle-ear deafness. According to an American publication, many cases of fatal toxæmia in infants with intestinal symptoms are due to otitis media, although there may be no ante-mortem evidence thereof.

When toxæmic symptoms develop during pregnancy, it is established that absolute rest in bed and a water diet are effectual in preventing eclampsia. Valuable work has been done on the exact constituents both of ergot and of pituitary extract that act upon the uterus; in the latter case an 'oxytocin' can be separated from a 'vasopressin'. The usefulness of version during the seventh month to turn a breech into a cephalic presentation is emphasized. A method of extracting the adherent placenta without putting the hand in the uterus, by injection of the vessels of the cord, is discussed. There is an account of the modern treatment of post-partum hæmorrhage. The articles on gynæcology include a note on the use of radium for bleeding fibroids.

In the section dealing with venereal diseases, a new and non-irritating silver compound, called citragan, is well spoken of as an injection. A method of supporting the inflamed epididymis is pictured. Animal experimentation on syphilis has taught us several useful lessons which are mentioned, amongst others the fact that a prophylactic ointment may allow a latent general infection to come on unnoticed, because there is no primary lesion.

New anæsthetics continue to make their appearance; the latest is 'avertin', given by the rectum. The occurrence of convulsions during ether anæsthesia is discussed.

An immense number of topics are passed in review in the articles on radiotherapy and X-ray diagnosis. The old dread of injuring the supra-renals by X rays seems to be without foundation. The value of lateral as well as anteroposterior skiagrams of the chest is mentioned. Brain tumours may respond well to radiotherapy. The X-ray appearances of dental sepsis are discussed at length, with illustrative plates.

Finally, we venture to commend to readers an article on the conduct of autopsies in general practice. In many criminal cases in recent years the medical evidence has been of crucial importance, and a general practitioner may suddenly find himself obliged to make a post-mortem examination on which the whole case turns. We believe that, if he wants direction in the conduct of such an examination, his needs will be met by the paper which appears in this volume.

JOSEPH PRIESTLEY

1859–1928

IT was in 1892 that Dr. Joseph Priestley first undertook the writing for the MEDICAL ANNUAL of the paragraphs on "Public Health and Medical Jurisprudence" that have been so prominent a feature of the volume ever since. Dr. Priestley was therefore our oldest contributor; but it is indeed difficult for anyone associated with him to realize how long he had been at work. In spite of his years, and the arduous career that he had adorned, he retained a certain youthfulness of mind which enabled him to give to the MEDICAL ANNUAL a service which was not only hearty and enthusiastic, but also fresh and stimulating. More than once we have learnt from our readers that it was to Dr. Priestley's paragraphs that they turned first of all. A more agreeable colleague it would be difficult to find. In recent years it has several times been necessary to ask him to trim his contributions so that they might dovetail with those of someone else. He always agreed cheerfully to these requests and often added some helpful suggestion which proved to us how interested he was in the welfare of the ANNUAL. It was probable that he would ere long have retired from this as he had already from much of his work; but the proof sheets of his contributions to the present volume were in his hands at the time of his decease, and we cannot but feel a certain satisfaction that it was only by death itself that he was withdrawn from a task that he had so faithfully and fruitfully performed.

JOSEPH PRIESTLEY

1859 - 1928

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DICTIONARY OF PRACTICAL MEDICINE

BY MANY CONTRIBUTORS.

ABDOMINAL INJURIES IN CHILDREN. *John Fraser, Ch.M., F.R.C.S.Ed.*

Michael Levin[1] considers this important subject in a study of 149 cases 118 boys and 31 girls. The distribution of the numbers is an interesting comment on the question of "living dangerously in relation to sex".

Perhaps the first point to impress the reader is the variability of the clinical evidence in different cases. Vomiting occurred in 30 per cent of the cases: in some 41 per cent there was no evidence of injury of the abdominal wall: muscular rigidity was recorded in 64 per cent of cases; temperature showed great variation, from subnormal to hyperpyrexia. In such uncertainty it is comforting to find one constant feature, for it is recorded that *general or local abdominal pain was present in every case.* We gather that the sign referred to was a tenderness to pressure, and therefore objective in character rather than subjective.

In discussing the diagnosis, the author presents the important features in the following order--tenderness, rigidity, injury of the abdominal wall. moderate elevation of temperature, vomiting, leucocytosis. Of these the most significant are local tenderness and muscular rigidity, and the conclusive statement is made that *no child who showed absence of both tenderness and rigidity was operated on.* An extension of a pain originally local is of great significance. In cases where the diagnosis presents peculiar difficulty fluoroscopic examination is valuable, in so far as it may show the presence of free gas in the peritoneal cavity.

Treatment recommendations are summarized under four headings: (1) To inaugurate treatment by correcting shock; (2) To give a blood transfusion where signs of progressive hæmorrhage exist; (3) To employ an adequate exploratory incision; (4) To examine with peculiar care the fixed points of the intestine.

REFERENCE. [1] *Ann. of Surg.* 1928, May, 718.

ABDOMINAL SURGERY, MISCELLANEOUS. *A. Rendle Short, M.D., F.R.C.S.*

Hiccough.—F. H. Lahey[1] finds that this troublesome complication of abdominal surgery can usually be stopped by **Carbon Dioxide Inhalation**, ✓ administered from a cylinder through a tube and funnel. Eight or ten breaths generally suffice.

Post-operative Ileus from Peritonitis.—Lahey, and also D. Macrae, jun.,[2] both insist on the value of jejunostomy in these anxious cases. It may well be performed at the time of the first operation when pelvic peritonitis is present. If the opening in the jejunum is made by the Witzel technique and omentum wrapped round the tube, it will close spontaneously when the tube is withdrawn after a few days. Macrae also speaks well of the new treatment with **Anti-gas-gangrene Serum.** (*See* MEDICAL ANNUAL, 1928, p. 239.) [We are very favourably impressed with the value of the serum, and believe that by its use, combined with a not-too-late jejunostomy under local anæsthesia, many cases can be saved which would have died a few years ago.—A. R. S.]

Preliminary Gastrostomy.—E. P. Quain[3] advises a prophylactic gastrostomy in all sorts of abdominal operations to make it unnecessary to pass the stomach tube afterwards if patients suffer from vomiting and nausea. The method has often been employed in Sweden. It seems too drastic for general use.

Drainage.—This vexed question was debated by the French Surgical Congress in October, 1927, at Paris, when many French and Belgian surgeons expressed their opinions. The rapporteurs were F. M. Cadenat and M. Patel.[4] They pointed out that there have been three periods: the first, up to 1900, when drainage was the rule, and various methods were tried out; the second, up to the end of the war, when drainage was out of fashion; and the third, in which we try to suit the treatment to the case. After discussing fully the advantages and drawbacks of the rubber tube, the slip of rubber dam, and the gauze method, they conclude that the authentic indications for drainage are two: hæmorrhage and infection. When there is an oozing surface which cannot be otherwise dealt with, the gauze pack is needful. The cases of infection that demand tube-drainage are those with walled-off pus, and cases of diffuse septic peritonitis operated on late. Thus a perforated gastric ulcer treated within a day need not be drained, but a third-day appendicitis should be. Stab drains are to be preferred to drains through the wound. French surgeons are usually very partial to the Mikulicz gauze pack in pelvic peritonitis.

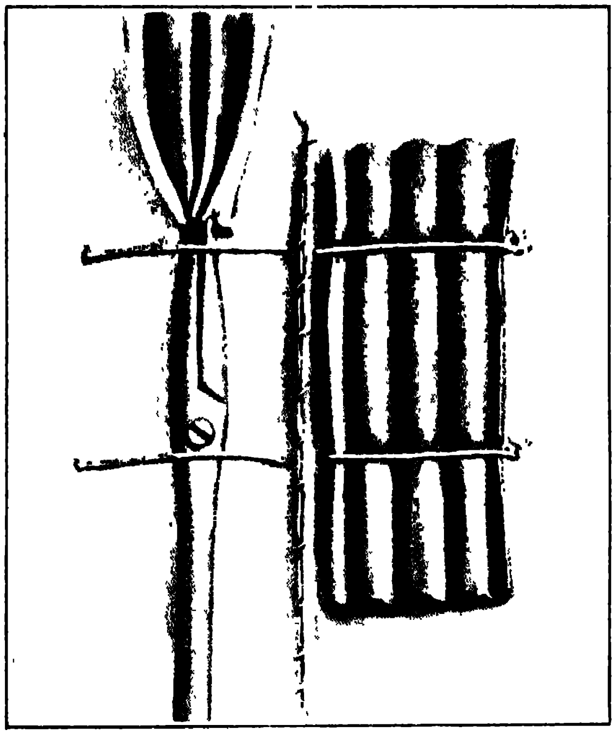


Fig. 1.—Suturing the fat abdominal wall. The corrugated rubber is shown in position on the right of the figure. On the left the rubber is grasped by the forceps ready to be drawn under the sutures. Two sutures only are shown for simplicity. (*Figs.* 1, 2 *by kind permission of the 'Lancet'.*)

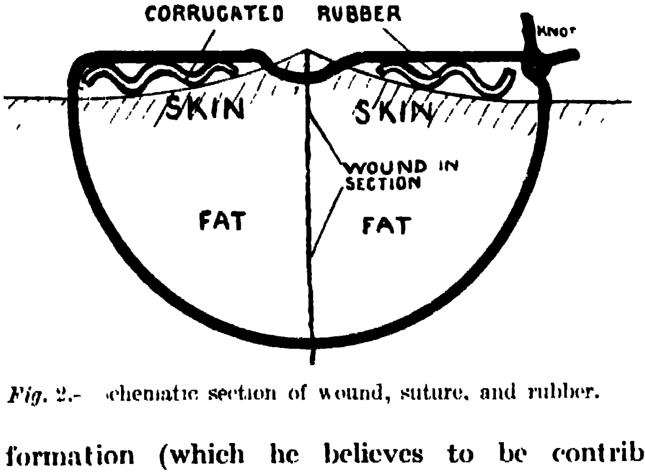


Fig. 2.—Schematic section of wound, suture, and rubber.

Incisions and their Closure.—To avoid the surgical struggle which sometimes ensues when the paramedian incision is to be closed, and the post-operative discomfort and adhesion formation (which he believes to be contributed to by nerve irritation), G. A. Sloan[5] describes a method for opening and closing the upper abdomen, which the accompanying illustrations (*Plates I–IV*) will make clear. It will be observed that the anterior sheath of the rectus on both sides is incised paramedially; the recti are retracted outwards, and the posterior sheath and peritoneum incised transversely. He declares that plenty of room can be

PLATE I

NEW UPPER ABDOMINAL INCISION

(G. A. SLOAN)

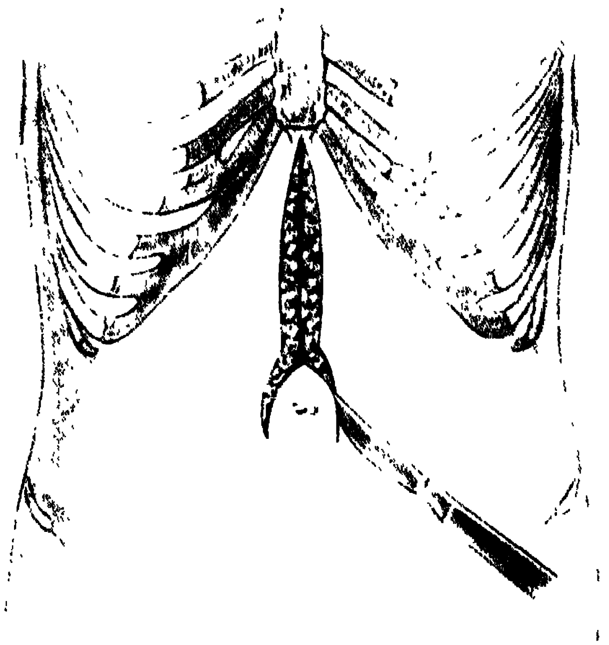


Fig. 1.—An incision through the skin and fat down to the fascia from the ensiform to a point 3 cm. above the umbilicus and continued outward and downward on each side of the umbilicus to a point 1 cm. below the umbilicus on either side, leaving a V-shaped piece of skin and fat around the umbilicus.

Plates I–IV by kind permission of
'Surgery, Gynecology and Obstetrics.'

PLATE II

A NEW UPPER ABDOMINAL INCISION—*continued*

(G. A. SLOAN)

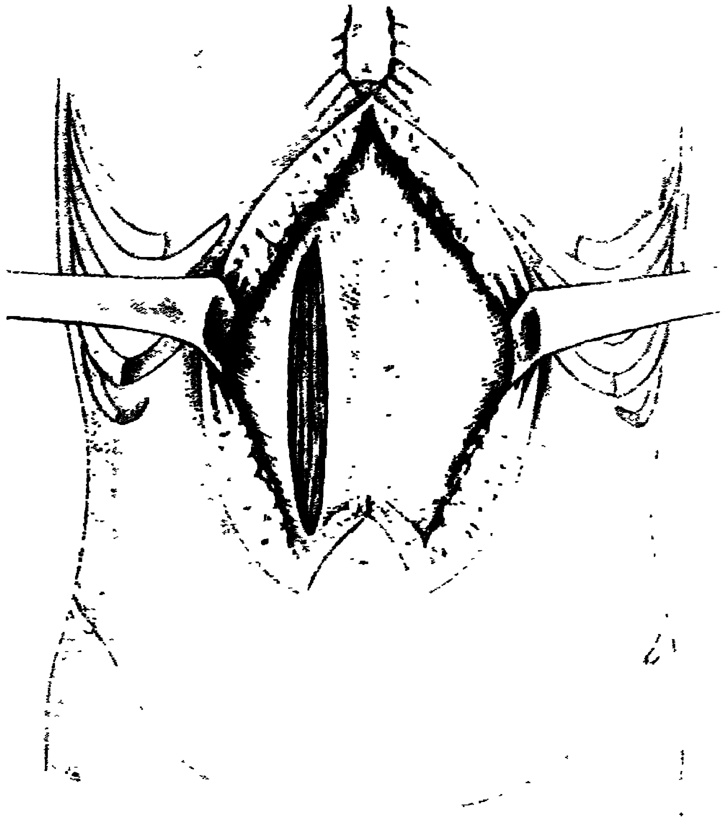


Fig. B.—Vertical incisions are made through the external sheaths of the recti about 1 cm. external to their inner borders. The length of these two incisions will depend on the amount of exposure that it has been possible to obtain.

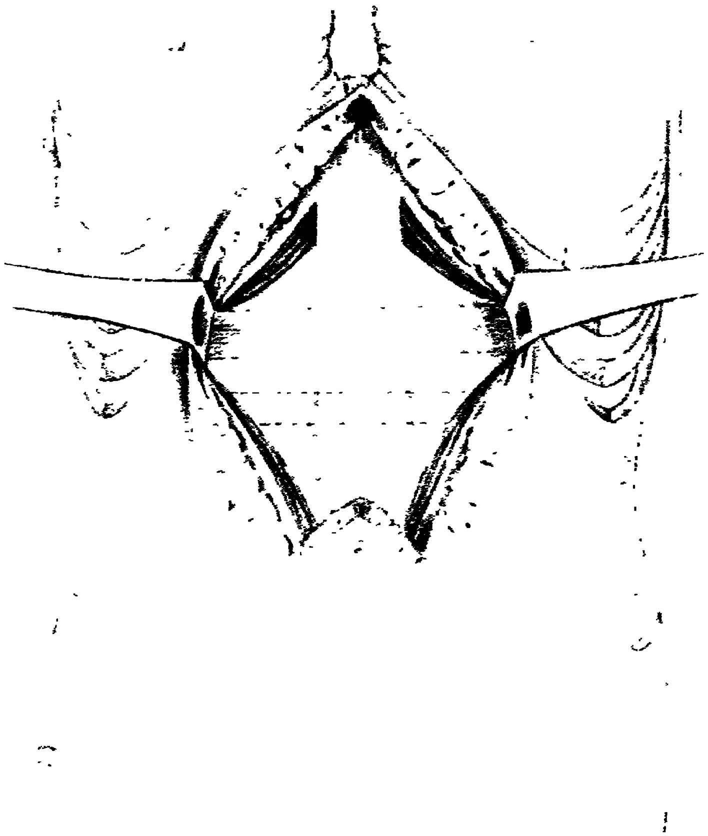


Fig. C.—[illegible] are pulled outward and held [illegible] retractors, exposing the posterior sheath of the recti. Dotted lines indicate locations that may be chosen for transverse incision through aponeurosis and peritoneum.

PLATE III

A NEW UPPER ABDOMINAL INCISION

[illegible]

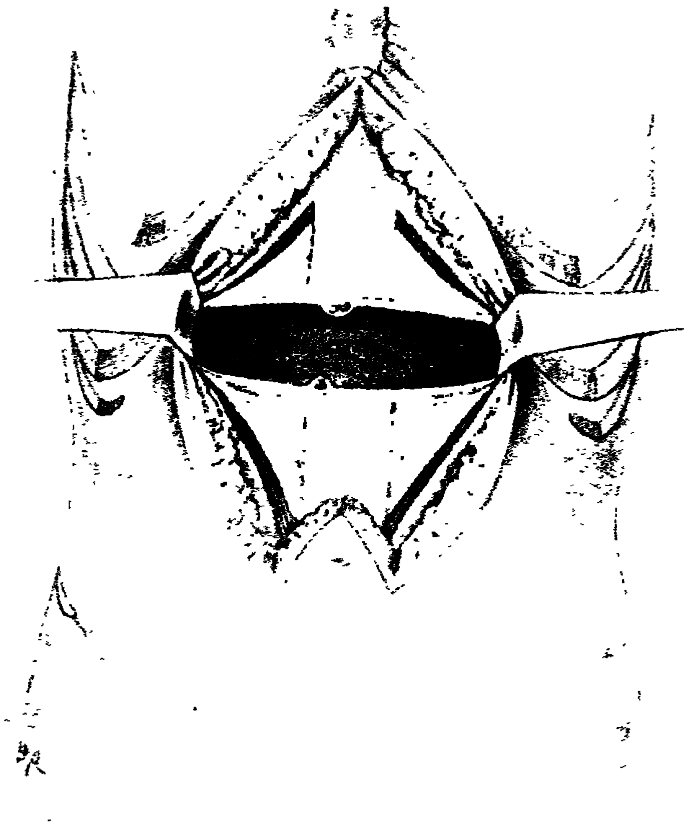


Fig. [illegible] The incision [illegible] function of the [illegible] muscles [illegible]

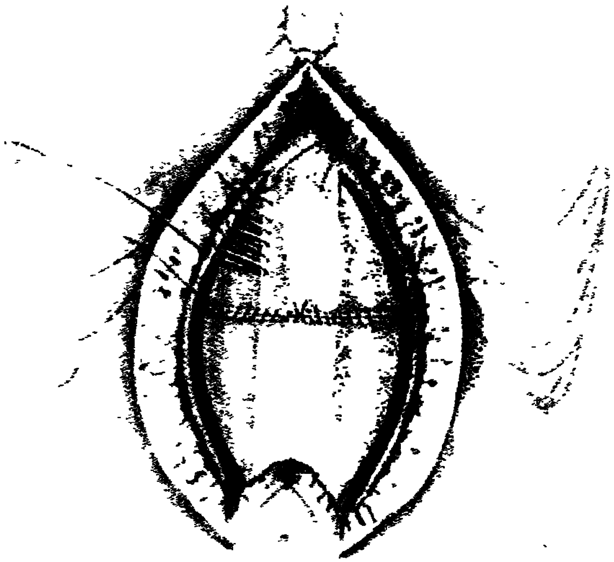
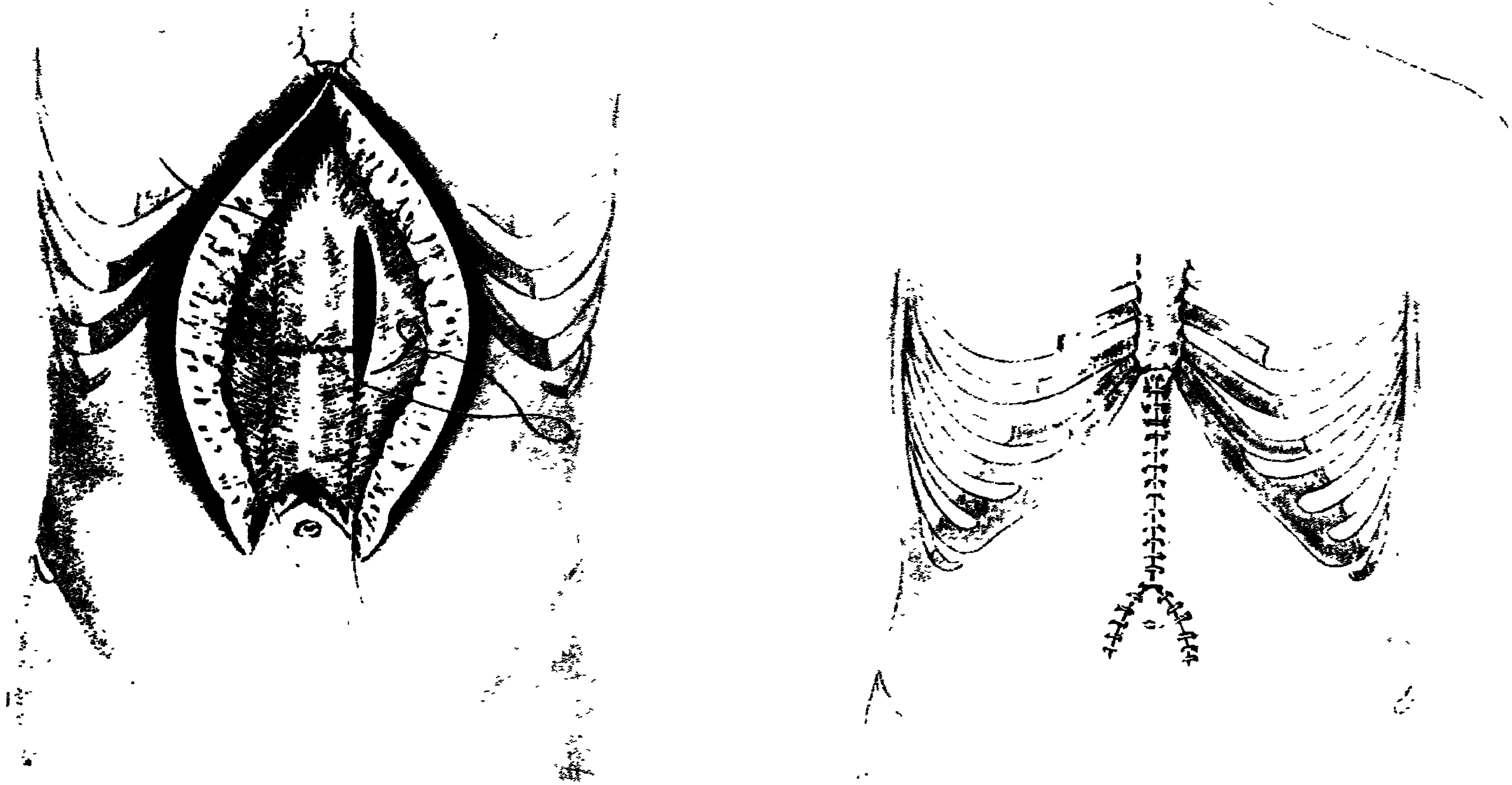


Fig. [illegible] No difficulty is experienced in closing the abdomen even with the largest and thickest [illegible] whatever is required to bring the edges together.

PLATE IV A NEW UPPER ABDOMINAL INCISION [illegible]

[illegible]



obtained for operations on the stomach, gall-bladder, and appendix, and the closure is very easy as there is no tension. Post-operative hernia should be impossible. [We have tried this incision and like it very well, but it does not provide much space. It is most suitable for a gastro-enterostomy. A. R. S.]

A. Edmunds[6] discusses the best means of closing a fat abdomen, and advocates the use of corrugated rubber dam slips under the sutures, which are passed as shown in *Figs.* 1 and 2 so as to evert the skin-edges.

L. Freeman[7] finds, by animal experimentation, that the giving way of abdominal incisions is generally due to intrusion of omentum between the sutured peritoneal edges, to be prevented by using a close-set and interlocked peritoneal stitch.

Post-operative Pneumonia.—The incidence of chest complications in the surgery of the upper abdomen is considered by M. Ascoli.[8] In the Clinica Chirurgica at Rome, the records show results as given in the accompanying tables. It will be observed that more trouble was experienced in cancer of

Table I.

Operation	Number	Chest Complications	Died	Complications per cent
Gastrojejunostomy ..	208	15	9	7·2
Gastric resection ..	95	18	11	18·9
Exploration .. .	60	3	3	5·0
Hydatid of liver ..	43	4	2	9·5
Cholecystostomy ..	2	-	-	
Cholecystectomy ..	73	—	- -	- -
Cholecystostomy and cholecystectomy ..	8	- -	- -	-
Splenectomy ..	10	4	3	40·0
Gastropexy	5	—	- -	-
Hydatid of spleen ..	3	-	- -	
Gastrostomy ..	7	1	1	14·3
Total ..	507*	45	29 (61·1 %)	8·8

* The figures do not add correctly, but are given as in the original.—A. R. S.

Table II.

	GASTRO-DUODENAL ULCER			CANCER OF STOMACH		
Operation	Number	Complications	Per cent	Number	Complications	Per cent
strojejunostomy	185	11	6·4	23	4	17·3
section ..	63	9	14·2	32	9	28·0
Total ..	248	20	8·06	55	13	23·5

Table III.

Anæsthetic	Number	Complications	Per cent
Chloroform–ether ..	63	7	11·0
Spinal	197	21	10·7
Local anæsthesia ..	8	2	25·0
Spinal and inhalation	35	3	8·6

the stomach than in ulcer, and that resection was more often followed by pneumonia than anastomosis. The cancer cases usually succumbed.

It will be observed from a study of Table III that the method of anæsthesia does not make as much difference as might be supposed.

Abdominal Surgery in Cases with Streptococcus Hæmolyticus.—A. Primrose[9] attributes success in a case with peritonitis thus caused to closure without drainage, and intravenous injections of **Phenol,** ¼ c.c. of 1-200 solution, repeated four times.

Severe Blood Extravasation into the Belly.—Büttner[10] discusses at length the best means of combating dangerous anæmia in such cases, usually the result of a ruptured ectopic pregnancy. He concludes that blood transfusion from a donor is best; that collecting, filtering, and injecting the extravasated blood may be used in desperate cases but is not free from danger; and that leaving the blood to be absorbed has a definite though limited value.

Artificial Pneumoperitoneum.—F. Partsch[11] reports a fatal case, in which the air was being introduced for X-ray purposes. It was a patient with hydatid of the liver. There was a thin lappet of the liver lying low, and the air was injected into it with the result that the man died forthwith from air-embolism.

Surgical Convalescence.—C. Roberts[12] has investigated the length of time that actually elapses before patients who have had various abdominal operations resume their industrial employment. He finds that after operations on the gall-bladder, for duodenal ulcer, and appendicitis, the return to ordinary work averages from 104 to 115 days, and after hernia, 84 days. These periods are probably unnecessarily long, and indicate the need for a better supervision of convalescence.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* 1927, Nov., 1735; [2]*Ibid.* Oct., 1113; [3]*Ann. of Surg.* 1928, March, 395; [4]*Presse méd.* 1927, Oct., 1236; [5]*Surg. Gynecol. and Obst.* 1927 Nov., 678; [6]*Lancet*, 1927, ii, 547; [7]*Arch. of Surg.* 1927, xiv, 600; [8]*Policlinico*, 1928, Feb. 65; [9]*Ann. of Surg.* 1927, July, 6; [10]*Arch. f. klin. Chir.* 1928, March, 93; [11]*Centralbl. f. Chir.* 1927, July, 1755; [12]*Brit. Med. Jour.* 1927, ii, 1013.

ABSCESS OF THE LUNG. (*See* CHEST, SURGERY OF.)

ACNE VULGARIS.

A. M. H. Gray, M.D., F.R.C.P., F.R.C.S.

J. C. Michael[1] records the results of the treatment of 246 patients with acne vulgaris by **X Rays** over a period of five years. The method adopted was that recommended by G. M. McKee,[2] but various adjunct measures were also employed. No permanent untoward effect from radiation was observed. Of 191 patients in whom the end-result of treatment had been determined, relapse occurred in 35 per cent after the first course of treatment. After a second short course, final success was obtained in approximately 85 per cent of the cases. Age was the most important factor as regards recurrence, which occurred in 44 per cent of patients of 18 years of age or under, but in only 7 per cent of those over 25 years. The majority of patients had recurrences during the first six months after cessation of treatment. The author thinks that constipation and digestive and other disorders increased moderately the number of recurrences, and that focal sepsis played a decisive rôle in failure to cure some cases.

REFERENCES.—[1]*Arch. of Dermatol. and Syph.* 1928, May, 587; [2]*X-ray and Radium in the Treatment of Diseases of the Skin*, Philadelphia, Lea and Febiger.

ACRODERMATITIS CONTINUA. (*See* SKIN, STAPHYLOCOCCAL INFECTIONS OF.)

PLATE V

ACTINOMYCOTIC ULCERATION OF INTESTINE

(SIR W. I. DE COURCY WHEELER)

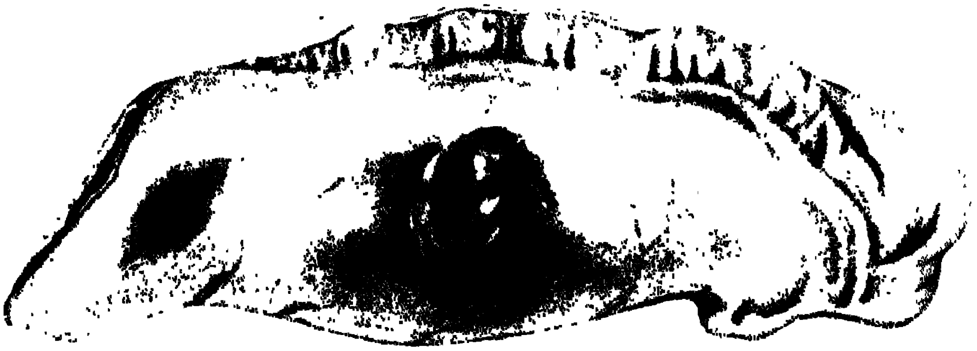


Fig. A. Drawing made immediately after operation showing inflamed jejunum with perforations.

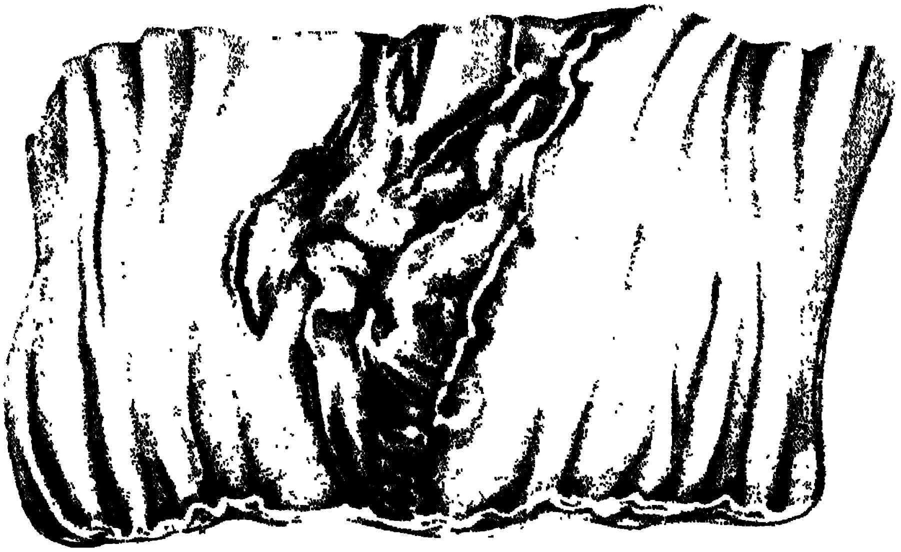


Fig. B. Jejunum opened, showing two transverse ulcers partially confluent. The ulcers encircled the segment of intestine.

Plates V and VI by kind permission of the "British Journal of Surgery."

PLATE VI.—ACTINOMYCOTIC ULCERATION OF INTESTINE—*continued*

(SIR W. I. DE COURCY WHEELER.)

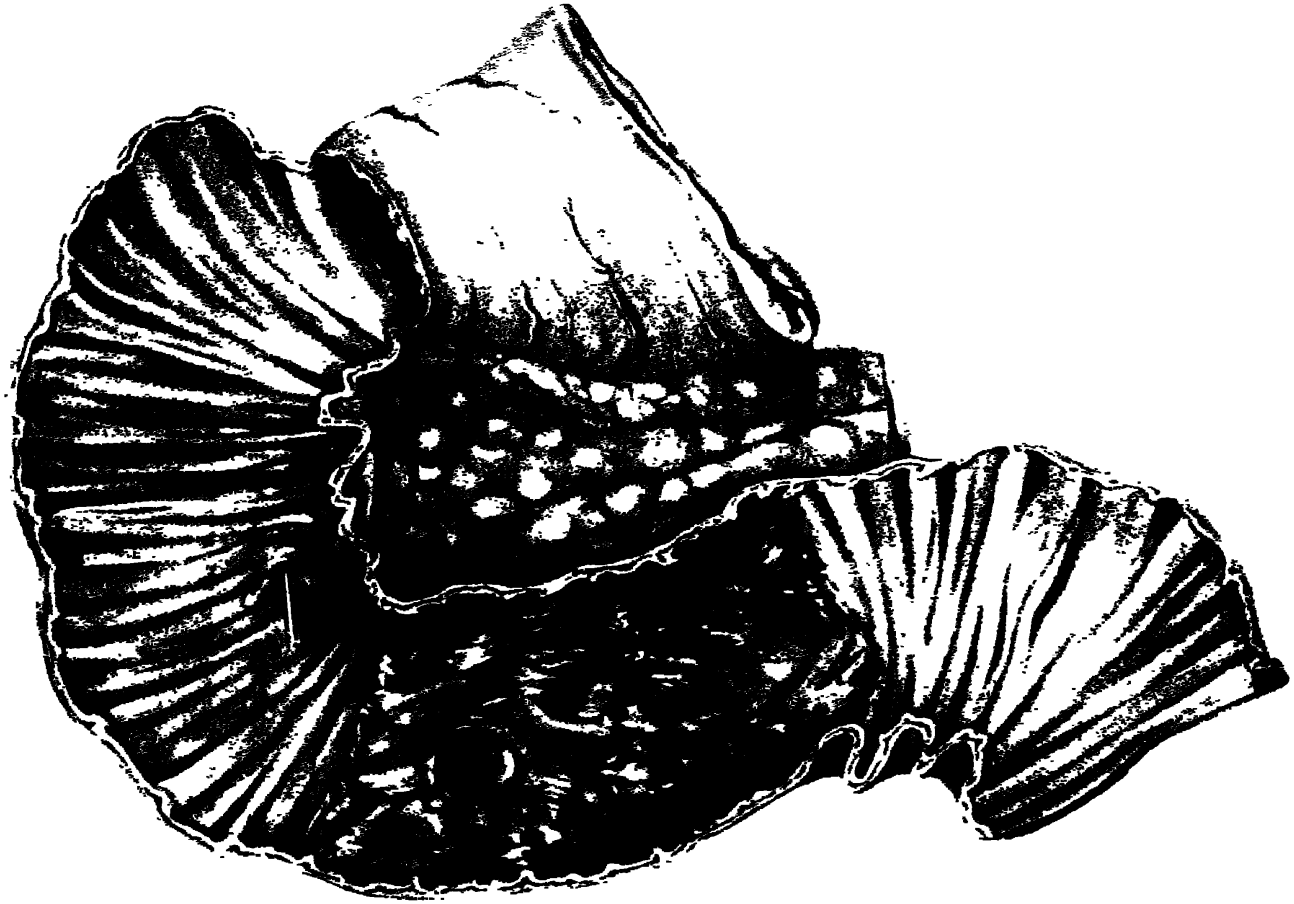


Fig. C.—Large duodenal ulcer found post mortem, extending from the bile papilla to the duodenojejunal flexure and encircling the entire circumference.

ACTINOMYCOSIS.

Sir W. I. de C. Wheeler, F.R.C.S.I.

Actinomycosis is comparatively rare, and in consequence cases are frequently missed. The condition is probably most common in the buccopharyngeal region. The fungus gains access to the tissues in this situation through small abrasions during mastication, especially in the presence of defective teeth. There is a plentiful supply of ray fungus in cereals and grasses. Fresh fruit and vegetables may be contaminated easily when packed in straw. The lower jaw, the tongue, and the peribuccal tissues are readily infected, and the pharynx and œsophagus do not always escape. Curiously enough, the stomach and small intestine are practically immune. The thorax may be infected by way of the œsophagus. It has been suggested that the acid contents of the gastric juice either kill the fungus or inhibit its activity, whilst the fluid contents of the small intestine are unlikely to produce any abrasions through which the streptothrix might escape. An attack of appendicitis, on the other hand, readily gives the opportunity for which the actinomycotic organism is waiting, with the result that cæcal actinomycosis is relatively common. The reviewer[1] recently saw a patient with signs and symptoms suggesting well-established gastric carcinoma. At operation, a tumour the size of a small egg was found in the jejunum (*Plate V*). It was adherent to the omentum and the neighbouring coils of intestine. When the tumour was isolated it was found to be red and inflamed, with much the appearance of an acute appendix. The tumour was resected and the patient died eight days later. At post-mortem examination a large duodenal ulcer was found extending from the bile papilla to the duodenojejunal flexure (*Plate VI*). The lesions were actinomycotic. Many micro-organisms were found in the superficial sloughs, the preponderating one being of streptothrix type. Organisms of the ray-fungus type were found in the floor of the jejunal ulcer, but only in the slough of the duodenal one. No streptothrix was found in the lymphatic glands. Secondary deposits in the lymphatic glands are rare.

In a second case of a man, age 35, treated in Mercer's Hospital, Dublin, the symptoms were largely those of gall-stones. As in the first case, there had been considerable loss of weight and severe anæmia. The history extended over about nine months, when pain commenced in the right hypochondrium. It radiated to both right and left scapular regions and there was marked local rigidity. The temperature was normal. A liver abscess was found. A small portion of liver was removed and was reported upon as actinomycosis of the liver. The patient died. At post-mortem examination small abscesses were found in the liver substance but no other definite focus of infection. The appendix was in a condition of chronic inflammation.

REFERENCE.—[1] *Brit. Jour. Surg.* 1928, Jan., 430.

ADDISON'S DISEASE. (*See* SUPRARENALS.)

ADRENALS. (*See* SUPRARENALS.)

ALCOHOL AND DRUG ADDICTION. (*See also* MENTAL DISEASES.)

Henry Devine, M.D., F.R.C.P.

Treatment of Addiction to Alcohol by Atropine.—B. Perott,[1] a Russian physician, states that this method was first introduced into Russia by Touvim. It is based upon the view that alcohol stimulates the cortex of the brain, and when this stimulation passes the limit of individual tolerance or acceptability, vomiting takes place. Hence, if it were possible to administer some substance which would keep this tolerance just at its limit, then the slightest addition of any stimulant, such as a few drops of alcohol, would result in vomiting, and even produce a distaste for alcohol. Similarly, people are unable to eat certain foods because at some previous time they ate too much. Touvim found that atropine produced a similar stimulation of the cortex to that of alcohol, so that if a certain amount of alcohol were introduced into an organism containing atropine, it would serve as an additional stimulant, would be unacceptable, and would be eliminated by vomiting. The **Atropine** may be given in the form of a mixture, as follows: Atropine sulph. 0·06 grm., aq. dest. 240 grm. Dose of atropine per diem, minimum 0·001 grm., maximum 0·01 grm. One teaspoonful of this mixture is equal to approximately 0·001 grm. Perott describes some cases in which this treatment has been successfully applied. He states that the ordinary case of habitual drunkenness can always be successfully treated by this method.

Quantitative Study of Acute Alcoholic Intoxication. E. Bogen[2] points out that the tremendous increase of motor traffic, with its greater speed and consequently greatly increased potentialities for serious accidents, has thrown upon the physician many more problems and greatly increased responsibilities in connection with the diagnosis of acute alcoholic intoxication, and the determination of the relationship between the degree of intoxication and the actions of the individual. The multitude of other morbid conditions which may either mask or mimic the symptoms of alcoholic intoxication must not be lightly dismissed. Under the circumstances that prevail at the time of the usual examinations for intoxication, following an accident, shock, or arrest, confusing functional disturbances are apt to occur. Although the differentiation between all of these conditions and acute alcoholic intoxication may readily be made in the majority of cases by the absence or presence of other signs or symptoms essential for the diagnosis, this is not always the case, and a man suffering from one or other of these conditions (e.g., a lesion of the nervous system) may, and frequently does, suffer also from the effects of drinking alcoholic liquors. The odour of alcohol is also misleading, since it may be missed in the presence of other strong odours, and may be present long before enough alcohol has been taken to produce demonstrable effects.

It is a matter of common knowledge that some men can drink many times as much as others without showing the same effects. This tolerance has been found to depend mainly on a lower rate of absorption of the alcohol, as it can be increased by dilution or food in the stomach, or by other factors slowing the rate of absorption. Numerous investigators, however, have found that the physiologic and psychologic state of the patient are directly proportional to the concentration of alcohol in the tissues, and the alcoholic content of the blood has therefore been suggested as an index to the state of intoxication of the individual. Since the concentration of alcohol in the urine is usually equal to that of the blood, and the amount in the expired air also bears a constant relationship to that in the blood, the alcoholic content of these excretions may also be determined for the purpose of evaluating the degree of alcoholic intoxication.

During the past year Bogen made more than three hundred such determinations on patients suspected of alcoholic intoxication, who were brought to the Cincinnati General Hospital, by methods which were particularly devised for the purpose. For ascertaining the concentration of alcohol in the urine, blood, or spinal fluid, 1 c.c. of the specimen was placed in a test-tube and a current of air bubbled through it, and then through 5 c.c. of a ½ per cent solution of potassium dichromate in 50 per cent sulphuric acid, for ten minutes, both tubes being immersed in a boiling water-bath. The colour change, from reddish-yellow to greenish-blue, was then measured by comparison with a series of standards previously made up with known amounts of alcohol. For determining the concentration of alcohol in the breath, 2 litres of expired air, collected in an ordinary football, were bubbled through 5 c.c. of a hot solution of the ⅓ per cent solution of potassium dichromate in sulphuric acid, and the colour change measured by comparison with the standard solutions. Many precautions and control tests were taken to secure accuracy and reliability in these tests. The results of these determinations showed a high degree of correlation with the incidence of intoxication in the patients. No patient having less than 1 mgrm. of alcohol in 1 c.c. of urine was pronounced intoxicated, but more than half of those with from 1 to 2 mgrm., three-fourths of those with 3 mgrm., and almost every patient with 4 mgrm. or more, was so diagnosed. The diagnosis of acute alcoholic intoxication was made only in the presence of unmistakable evidence of loss of control of speech and movement resulting from alcoholic imbibition, and was uniformly sustained by the Cincinnati traffic court in the several score of cases that have come before it. A study of the results in the series of cases reported, as well as those recorded by other observers, leads to the conclusion that the alcoholic concentration of the urine, breath, or tissues is the most reliable single factor in arriving at a correct conclusion as to the degree of intoxication of a patient.

Alcohol and Alcoholism in Relation to the Problems of Nutrition and Health. - H. Maclean[3] points out that, on the one hand, there is no doubt whatever that alcohol in excessive amount does harm, and that the extent of this deleterious action depends to a great extent on the individual. On the other hand, all the better and more important evidence goes to suggest, on the whole, that alcohol in small doses does not result in any definitely harmful results.

From the point of view of nutrition, he shows convincingly that alcohol fills no place in the economy of the healthy individual. Though it is a food, the usual foodstuffs are better, and are devoid of the toxic action of alcohol. The idea so prevalent among labourers that alcohol helps them is a myth ordinary carbohydrate is more efficient as a source of muscular energy. In the case of the sick, however, there is no doubt that alcohol may sometimes prove useful in sustaining nutrition and resistance under conditions in which ordinary food cannot be utilized, and from this point of view it is useful. The whole problem, he concludes, boils down to the statement that in the healthy individual alcohol is unnecessary. Whether or not its action on the nervous system, by which it engenders a feeling of well-being and happiness, outweighs its defects, each individual must settle for himself.

Therapeutic Use of Alcohol.—There can be but little question that alcohol is used much less in medicine at the present time than was formerly the case. J. D. Rolleston[4] gives some interesting figures which show that a striking reduction in the consumption of brandy at the Western Fever Hospital, following

TABLE INDICATING THE CONSUMPTION OF BRANDY AT THE WESTERN FEVER HOSPITAL.

	1925.	1926.	1927.
First quarter	798 oz.	914½ oz.	5 oz.
Second ,, ...	344 oz.	61½ oz.	12 oz.
Third ,, ...	340 oz.	13 oz.	5 oz.
Fourth ,, ...	1107 oz.	2½ oz.	3½ oz.
Total ..	2589 oz.	991½ oz.	25½ oz.
Diphtheria mortality ..	8·54 per cent	4·42 per cent	3·01 per cent

his appointment, had no prejudicial effect upon the patients. The mortality of diphtheria in particular, on which most of the brandy was used, has shown a decline, although the type of disease has remained the same.

The Effects of Tobacco. In view of the increasing prevalence of the tobacco habit, an authoritative survey of the effects of tobacco upon the organism and the individual by W. E. Dixon[5] is of interest. His subject is considered under the following headings: the composition of tobacco smoke; carbon monoxide; nicotine; amount of nicotine in smoke; general and specific use of tobacco smoke; its effects upon the alimentary canal, circulation, nervous system, and mental efficiency; and amblyopia. We can here do no more than give a summary of his paper. Tobacco-smoking, he concludes, serves as a mild stimulant, followed by a slight degree of narcosis; the supersensitive become calm and lose their irritability, and the dull and apathetic are stimulated. The physiological evidence clearly points to this effect, but the explanation has yet to be learned. But smoking leads to digestive and circulatory disturbances. There is an increasing impression amongst clinicians that the insidious action of nicotine spread over many years of continuous absorption is responsible for at least some of the cardiovascular diseases so common in middle and later life. It may be argued that if nicotine adds to the agreeableness of life, why not use a path so pleasant? It may well be that living in a civilization such as ours, under the strained conditions imposed by residence in cities, the ordinary man shows in his responses variations from the normal, and on such tobacco exerts a beneficial function. To what extent strict moderation in the use of tobacco leads to vascular degeneration is uncertain; is it the rule or the exception? Professor Dixon considers this is the vital question to which we require an answer, and upon this answer something of the well-being of the nation depends. (*See also* ANGINA PECTORIS, p. 38.)

Drug Addiction. –

Relapse in Drug Addiction. In a clinical contribution to the problem of drug addiction, L. Kolb[6] discusses the addict's struggle for cure and the conscious reasons for relapse. The relapse of drug addicts is mainly due to the same cause that is responsible for their original drug addiction, namely, a pathological nervous constitution with its inferiorities, pathological strivings, etc., from which relief can only be obtained by the use of narcotics. Nowadays the laws restricting the sale of drugs prevent milder cases from resorting to drugs after they are once 'cured', but the more severe cases revert again and again and so relapses seem to be more common. Nearly all addicts make sincere efforts to be cured in the earlier stages, but later the effort is at best half-hearted and only undertaken for the sake of expediency. The hope for cure wanes as time passes, and the force of habit, numerous memory associations, and increasing physical dependence on opiates are added to the original pathological nervous condition. At the same time physical dependence on opiates is unimportant as a cause of relapse during the first two or three years of addiction in those who have been off the drug for two weeks or more. In some very nervous subjects, with addictions of long standing, withdrawal of the drug may produce hysterical symptoms or hypomania which may last for several months.

Treatment by Narcosan.--In the MEDICAL ANNUAL for 1928 we gave a somewhat full account of the results obtained by Lambert and Tilney by the use of **Narcosan** in cases of drug addiction. The composition of narcosan as stated by the above-named clinicians is a solution of lipoids together with non-specific protein and water-soluble vitamins. The theory of the action of narcosan in the body is that narcotics such as morphine call forth certain protective substances to neutralize them. If the narcotics be suddenly withdrawn and not given, these neutralizing substances are themselves toxic to the body. The lipoids in narcosan neutralize these toxic substances in place of the narcotics. According to G. S. Johnson,[7] narcosan has not come up to expectations in the treatment of drug addicts. The use of this drug was begun at the Colorado Psychopathic Hospital early in 1927, and since its introduction it has been given to twenty-four unselected cases addicted to the use of opium or its derivatives, chiefly morphine. In addition to the results obtained in these twenty-four cases, those obtained in twelve cases treated in the hospital prior to the introduction of narcosan are included in the report as well. This treatment consisted in the **Immediate Withdrawal** of all narcotics, the use of **Bicarbonate of Soda** to combat any tendency toward acidosis, **Detoxification** by the use of **High Colonic Irrigations**, and the control of restlessness by the use of **Continuous Baths** at a temperature of 98 to 100° F. The narcosan treatment of the twenty-four cases was carried out according to the method indicated by Lambert and Tilney. As the result of his trial of this new drug, Johnson reaches the following conclusions: (1) Patients treated for narcotic addiction by the use of narcosan show the usual withdrawal signs; (2) Of 24 patients treated, 11 were subjectively relieved by the narcosan, while 13 could see no effect or were made uncomfortable; (3) Of the 11 patients who were subjectively relieved by the narcosan, 7 were known to have returned to the use of morphine, and the status of 3 is unknown; (4) Narcosan is not as effective in controlling sleeplessness and restlessness as methods previously employed at the Colorado Hospital; (5) Narcosan is not of any added value in the treatment of drug addiction, and this treatment remains a psychiatric problem.

REFERENCES. [1]*Clin. Jour.* 1927, Dec. 7, 587. [2]*Jour. Amer. Med. Assoc.* 1927, Oct. 29, 1508; [3]*Brit. Jour. Inebriety*, 1928, April, 183; [4]*Ibid.* 201; [5]*Ibid.* Jan., 99, [6]*Jour. Nervous and Mental Dis.* 1927, July, 22, [7]*Colorado Med.* 1927, Nov., 347.

AMŒBIASIS. *Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.*

ETIOLOGY.—A further difficulty has been introduced into the already complicated subject of the differentiation of the pathogenic *E. histolytica* cysts from harmless ones by E. Brumpt,[1] who records much work to show that an entamœba he calls *E. dispar* has four nucleated cysts identical in their morphology with those of the pathogenic organism, and which can only be distinguished from the latter by their not producing fatal amœbic disease of the colon on injection into the rectum of kittens He finds the harmless form to be present frequently in human subjects in temperate climates, and he thus explains the frequency of four nucleated cysts in healthy persons with no sign of infection from them in England and France. Thus, a further complication is introduced into the diagnosis of pathogenic cyst carriers, which can only be solved by animal experiments on kittens, if this view is correct. C. F. Craig[2] describes a hæmolytic substance extracted with alcohol from cultures of *E. histolytica*, and also cytolytic and complement-binding substances obtained in the same manner. In a further paper the same worker[3] describes the use of the complement-fixation test in the diagnosis of *E. histolytica* infections, which is specific for the pathogenic organism; and the reaction disappears with the removal of the infection.

W. Yorke and A. R. D. Adams[4] deal with the development and excystation of *E. histolytica in vitro*, and failed to confirm the statement of Dobell and Laidlaw that before the cysts can develop further they must be allowed to cool for two or three days. The same workers[5] also disagree with Sellard and Theiler's conclusion that relapses may be due to hatching out of cysts which have persisted in the colon for some time.

Diagnosis.—The diagnosis of intestinal amœbiasis is dealt with by W. M. James,[6] who advocates the use of wet fixed and stained permanent preparations of stools for the diagnosis of the presence of pathogenic amœba, by which means he states the positive results could be raised at the first examination from 33 to at least 75 per cent, and by a second examination to 90 per cent. Thinly spread slide preparations are fixed for ten minutes in Schaudin's fluid without being allowed to dry, passed through alcohol, and stained and examined.

Treatment.—C. F. Craig[7] deals with the diagnosis and treatment of *carriers*, who, he notes, usually present some clinical symptoms of their infection, including colicky pains, irregularity of the bowels, and slight anæmia. Six examinations of the stools combined with cultures are needed for the diagnosis, and sedimentation of the fæces is of value in searching for cysts in formed stools after removing fæcal matter by washing. **Stovarsol**, given in doses of one-half of a 0·25-grm. tablet three times a day for a week, and repeated for another week after one week's interval, has given very good results in carriers without the necessity of lying up for the treatment, and has proved the most satisfactory method in carriers, and it also removes any symptoms and causes an increase in weight.

R. N. Chopra, J. C. Gupta, and K. V. Pillai[8] have tested the action of **Emetine** on intestinal muscle and on the intestinal circulation, and they found it had a direct stimulating result on the muscular coat of the bowel, most marked on the large intestine, and also caused congestion of the mucous membrane, and thus brought the drug to the diseased bowel. R. Knowles and his assistants[9] record an analysis of the immediate results of the treatment of intestinal amœbiasis in the hospital of the Calcutta School of Tropical Medicine, but the patients could not be followed up after discharge. The proportion of probable cures to failures, and of negative stools to positive ones, are taken as a guide to the value of the various methods tried. They conclude that the simultaneous injection of **Emetine** and **Stovarsol** orally gave the best results, but **Yatren** was both the most expensive and one of the least efficient of eight drugs tried. **Conessine,** or the total alkaloids of kurchi, gave less good results than the whole drug orally. A very valuable summary of the literature with numerous references concludes a paper which is worthy of close study.

Amœbiasis of the Liver.—This is dealt with by E. C. Cort,[10] who agrees with the general opinion that the open operation is unnecessary in the cases without secondary bacterial infection, which form the vast majority, and that **Emetine** injections and **Aspiration** should be relied on; he rightly regards the drug as approaching a specific in liver infections, although not so efficient in intestinal ones. **Stovarsol** is a useful addition for one week after improvement has begun.

References. [1]*Trans. Roy. Soc. Trop. Med. and Hyg.* 1928, Aug. 22, 101; [2]*Amer. Jour. Trop. Med.* 1927, July, 225; [3]*Ibid.* 1928, Jan., 29; [4]*Ann. Trop. Med. and Parasitol.* 1927, July, 281; [5]*Brit. Med. Jour.* 1927, ii, 486; [6]*Jour. Amer. Med. Assoc.* 1927, Oct. 29, 1469; [7]*Ibid.* 1928, April 28, 1345; [8]*Ind. Jour. Med. Research,* 1928, April, 883; [9]*Ind. Med. Gaz.* 1928, Aug., 455; [10]*Jour. Amer. Med. Assoc.* 1928, June 23, 2005.

ANÆMIA, PERNICIOUS.

Ivor J. Davies, M.D.

Etiology.

S. Davidson (Edinburgh),[1] in an investigation of pernicious anæmia with special reference to *Bacillus welchii* as the causal agent, presents the following summary of his report: (1) Clinical symptoms and pathological findings support the view that pernicious anæmia is caused by an absorption of toxin from the intestinal tract. (2) A bacteriological examination of both small and large intestine shows a non-proteolytic fermentative flora which is typical for pernicious anæmia. A qualitative examination shows the organisms to be similar to those found in health; a quantitative examination shows an enormou increase of viable organisms, particularly in regard to *B. welchii*. (3) Biologica and experimental evidence points to the *B. welchii* as the most probable causa agent.

D. I. Macht (Baltimore)[2] submits an experimental contribution to the etiology diagnosis, and treatment of pernicious anæmia. The following summary i drawn from his paper: (1) A phytopharmacological examination of blood serum from cases of pernicious anæmia shows that such serum is very toxic for plan protoplasm, and thus suggests a toxin as the etiological factor in the disease (2) This phytotoxic property of pernicious anæmia serum is not shown by blood specimens from various other blood diseases, and is in this way usefu as an aid in the differential diagnosis of this condition. (3) Irradiation o the pernicious anæmia serum with ultra-violet rays in quartz containers renders the serum less toxic, and that effect can be increased by the addition of certai phytodynamic sensitizers in the laboratory. (4) The phytotoxic reaction ha been used in following a limited number of cases under various forms o treatment, and the decrease in toxicity was found not to run parallel wit the improvement in the general condition of the patient: as a result of suc a study the value of certain newer forms of therapy has been weighed.

A. T. Cameron and M. E. Foster (Winnipeg)[3] have studied the relationship between corpuscular hæmoglobin and chloride contents in the anæmias. They conclude: In pernicious anæmia the hæmoglobin content of a given volume of red blood-corpuscles is invariably above the average normal value, and usually much above this value. On the other hand, the chloride content is almost always below the average normal value, suggesting that a causa relationship may exist between these two constituents. In the secondary anæmias the chloride content is usually above the average normal value, but all variations of hæmoglobin value are found. In a single case of anæmia from *Diphyllobothrium latum*, high chloride and very low hæmoglobin values were found.

S. Davidson[4] reviews the factors concerned in the etiology of pernicious anæmia. Briefly stated, a primary anæmia is considered by the writer to be the result of a deficiency of a specific factor necessary for normal blood formation, together with some degree of constitutional weakness of the bone-marrow. In this writer's opinion, it is essential that the constitutional factor be accepted as existing in patients suffering from pernicious anæmia. This hereditary weakness may exist in any system, but its manifestation in the stomach, liver, bone-marrow, and central nervous system requires special emphasis.

The inherent weakness, except in the case of the stomach, may vary in degree in the different systems. The onset and the severity of the lesions produced in the different systems are directly related to the degree of constitutional weakness present. The importance of this statement will be realized on examination of the following paragraphs.

If a triangle can be mentally depicted in which the angles at the base represent Cohnheim's and Hunter's hypotheses of the etiology of pernicious anæmia, while the third angle represents the recent knowledge derived from the therapeutic value of liver extract, it appears possible to correlate all the factors concerned. Cohnheim's belief that abnormal formation of blood is the primary factor in the disease appears to be clearly proved.

Hunter's theory, in so far as it teaches that hæmolysis in the portal circulation is the essential feature of pernicious anæmia, must be discarded. On the other hand, his observations, as well as those of Hurst, on the gastro-intestinal sepsis with its concomitant absorption of toxins are based on firm scientific foundations. The bacteriological evidence of the gastro-intestinal sepsis is so complete that if auto-intoxication does not occur in pernicious anæmia it can never occur at all. It is quite unnecessary to state categorically whether the toxin is produced by one or all of the micro-organisms present in such abnormal numbers and position, or even whether it is the result of bacterial action on the ingested food materials.

It is proposed to follow the course of this toxin. It first comes in contact with the red blood-corpuscles in the portal circulation. When these cells are healthy mature corpuscles, it is unlikely to have any damaging effect on them; when they are abnormal immature cells, its effect, while not actually hæmolytic, would be to weaken them further and hence prepare them earlier for the normal process of phagocytosis in the reticulo-endothelial system—a process which has previously been shown to be so greatly increased in pernicious anæmia.

The toxin is next carried in the blood-stream to the liver. This organ has many functions to perform, the most important of which are those connected with glycogen and pigment metabolism, and the production of a hormone necessary for the maturation of blood-corpuscles. In addition, the liver, by its detoxicating action, prevents the passage of toxins into the systemic circulation. Since pernicious anæmia is a disease of middle life, it is obvious that the liver successfully overcomes the intoxication for a long period. Eventually the damage sustained by the liver in this process reduces its functional activity and the toxin escapes into the general circulation, thus reaching all the organs in the body. It is possible to visualize a stage in the intoxication when the liver and kidney cells which secrete the special hæmopoietic hormone have not been sufficiently damaged for the 'hormone threshold' in the blood to be lowered to the point at which abnormal blood formation results. If, however, the central nervous system contained a marked constitutional weakness, the toxin would produce the lesions of subacute combined degeneration before the symptoms of anæmia appeared. The time of appearance and intensity of the lesions would depend primarily on the degree of the constitutional weakness of the system. Clinical findings are in favour of this view, since the most severe cases of subacute combined degeneration are those in which the symptoms due to nerve lesions appear first and are more prominent than those due to the anæmia.

The same arguments apply exactly to the liver and the bone-marrow. In the majority of cases of pernicious anæmia the constitutional factor in the central nervous system is absent or of a slight degree, whereas it is at its maximum in the organs last mentioned. Hence the predominant symptom is anæmia. The hypothesis enunciated enables the theories of Cohnheim and Hunter, and the recent researches of Minot and Murphy, to be brought into relation one with the other. Where the liver is the organ mainly affected, the primary cause of the anæmia will be the deficiency of the specific substance necessary for the maturation of megaloblasts in the bone-marrow. Accordingly, if the bone-marrow is functionally efficient, the administration of liver extract should immediately produce a remission, which is, as has already been shown, the result of normoblastic activity. On the other hand, where the bone-marrow is functionally inefficient, for hereditary or other reasons, the giving of the specific substance cannot be expected to be equally efficacious. The relative degree of inefficiency in each organ can be assessed by the response to treatment with liver extract. The great majority of cases of pernicious anæmia respond promptly, and hence the primary abnormality is the lack of the specific stimulant. A small proportion of cases react less quickly and require much larger amounts of extract before satisfactory therapeutic results are obtained. These cases must be considered as possessing a degree of functional inefficiency in both systems. Finally, aplastic anæmia can be taken as an example of the condition where the bone-marrow is incapable of regeneration. It is essential to realize that the degree of intoxication which will injure tissues which have a constitutional malformation may produce no appreciable effect on those normally constituted.

DIAGNOSIS.

F. C. Eve,[5] in a contribution on the diagnosis of pernicious anæmia by '*blood haloes*', investigated 60 cases, and is convinced that the camera blood-halo method is quick, easy, and reliable, yielding in cases suspected of pernicious anæmia and subacute combined degeneration of the cord decisive clinical information, which is otherwise available only with difficulty and labour.

TREATMENT.

The **Liver Treatment** of pernicious anæmia is the most important advance in therapeutics in modern times. J. D. Adamson (Winnipeg),[6] in an interesting historical review, refers to Galen's view of the liver as the organ of 'sanguification'. Galen saw the liver interposed between the gastro-intestinal tract and the heart and intimately connected with each, and with the mind of a genius made the inference that the liver was interposed between the gastro-intestinal and cardiovascular system in order to transform chyle into blood. Galen's theory was accepted unchallenged until Bartholin published his work upon the lymphatics, and in his last chapter (" in a vein of learned gaiety he wrote an epitaph for the liver ") regarded it as having been reduced from the position of 'maximus heroibus' to that of a large dull bile-producer. Harvey could not bring himself to relinquish Galen's theory, though he admitted the existence of the lacteals. He still considered the liver to be the chief organ of sanguification, mainly because of the obvious fact that much blood flowed continuously from the gastro-intestinal tract to the liver. Modern investigation on liver function has at every step confirmed Galen's theory. It has been shown that much the larger proportion of the aliment, after being acted upon by the gastro-intestinal tract, is picked up by the vena porta and transmitted to the liver, where it is altered and made suitable for general circulation. It is, in truth, sanguified. Some of the important sanguification processes brought to light by modern research work are: maintenance of the blood-sugar level; changing ammonia into urea; detoxicating certain materials formed in the gastro-intestinal tract; destruction of certain bacteria absorbed from the gastro-intestinal tract; absorption and storing of certain fats from the blood; and controlling or profoundly influencing iron metabolism. To these well-known liver activities another has recently been added, which still more restores the liver to its ancient rôle. The discovery that the ingestion of liver almost invariably produces a remission in Addison's anæmia is, from a practical point of view, the most important observation yet made upon liver activity.

G. R. Minot and W. P. Murphy in 1926[7] reported on the beneficial effect of a diet rich in liver in 45 cases of pernicious anæmia. They now record further observations on these patients who have continued to take the diet from about one to three years, and add information concerning 60 others, a total of 105. The result of their extended study[8] is most favourable. The improvement was usually rapid and striking, and accompanied by a marked and prompt increase of the red blood-cells in almost every case. In 99 cases the number rose to 4 million or more per c.mm., and usually within two months if the diet was adequate. The counts remained at this level except for temporary, seldom marked, drops in approximately 15 per cent, drops particularly associated with the partial or complete omission of the prescribed amount of liver. Improvement in neural symptoms was most gratifying to the patient, and such symptoms did not definitely progress or develop under adequate dietary treatment. The patient must also take a well-balanced full diet, which included besides liver (200 grm. cooked weight daily) generous amounts of fruit and vegetables and red meat. Raw liver is probably more efficacious than cooked. Many patients preferred raw liver pulp to cooked liver, as they looked on it more in the nature of a medication than food. Minot and Murphy prescribed often about 180 grm. (6 oz.) of the prepared pulp a day, divided into two portions, and taken, mixed with orange juice or water, mid-morning and mid-afternoon. The juice pressed from raw liver is efficacious in large amounts. If necessary liver can be given by a stomach-tube. Very sick patients so treated have shown a remarkable and rapid improvement. At first the patient may be able to take only a little liver, but by perseverance and encouragement and giving but a little other food Minot and Murphy were soon able to induce these patients to take a full amount. They emphasize the necessity of prolonged continuation of the diet, the ultimate effect of which can be determined only in the future.

In a later communication[9] the same observers report treatment of 125 cases, and their conclusions are practically the same. Reports from the Continent are fully confirmatory. Rosenow[10] added to the treatment **Irradiated Ergosterol** in olive oil, 8 drops three times daily after meals, and favourable results were obtained.

In a preliminary report by the Medical Research Council it was stated that the treatment of pernicious anæmia by addition of liver to the diet, introduced in America by Minot and Murphy, has already been widely adopted with encouraging results. In order to ascertain the nature of these results the *Lancet* asked a representative group of clinicians to send a schedule of cases showing the proportion of successes and failures and other important information. The results[11] were uniformly good, and agreed with those of Minot and Murphy and others. Fresh liver (½ lb. daily) was given to most of the cases, and the liver extracts used in a minority of the cases were found to be almost as efficacious as the whole liver. The effects on nervous manifestations were in accord with those already described: symptomatic improvement with little or no change objectively. Definite objective improvement occurred in a few cases of subacute combined degeneration, resulting in the disappearance of an extensor plantar reflex in one case and of Rombergism and an ataxic gait in the others. These facts strongly support the view already expressed *that liver in one form or other is specific for pernicious anæmia.* It had no effect in cases of secondary anæmia or aplastic anæmia. There was no evidence of the disappearance of achlorhydria under treatment.

The Medical Research Council's preliminary report[12] states that a satisfactory extract was prepared by a modification of the American process of which an account has been published by Cohn and others, and the co-operation of three manufacturing firms was obtained. A daily dose of extract corresponding to ½ lb. or 250 grm. of liver generally brought a definite rise in reticulocytes, reaching a maximum about the twelfth or fifteenth day. The result of administration in thirty-four cases was satisfactory. The report states that the particular modification used in preparation has not necessarily any peculiar value as compared with the original process or with possible alternatives, but the experiments made for the Council have shown that it is one which is capable of ready application on a large scale, and which, according to the clinical indications, yields a satisfactory product.

Professor F. R. Frazer, H. F. Brewer, and A. Q. Wells[13] record their results of treatment of 19 cases of pernicious anæmia with whole liver or a liver extract.

Nine of them were in the first attack or in a relapse, and 7 of these showed a prompt response to treatment, with a temporary rise in the percentage of reticulated red cells in the circulating blood, and a steady increase in the total red cells and hæmoglobin. The reason for the failure of the treatment in the other two patients is not clear. Ten patients commenced treatment during the remission stage or received other forms of treatment in addition, so that observations on the immediate effects of the treatment were not possible. The condition of these patients at the end of varying periods of treatment (up to six months) affords confirmatory evidence of the value of this treatment. A few cases showed mental disturbance, and a remarkable improvement almost amounting to a change of temperament took place in a few cases.

S. Davidson, J. G. McCrie, and G. L. Gulland[11] have treated 42 cases of pernicious anæmia with whole liver or liver extract. The impression is that the favourable effects are more rapidly and regularly produced than by any former method and, most important of all, the recovery is more complete. The return to vigorous health is certainly more frequent and complete—and to be hoped permanent—than has ever before been experienced. 'Reticulation' is reviewed in detail, and for the demonstration of the phenomenon, vital staining, i.e., the treating of the blood with a suitable stain without any previous or concomitant fixation, is necessary. The technique of vital staining is described. The liver extracts were equally efficacious, and it is a matter of personal liking or convenience whether the whole substance or the extract is chosen. The importance of giving sufficient quantities of liver is clearly brought out. There is no risk in a large majority of the cases. Renal complications may arise. Gulland pointed out long ago that the only condition which will cause a persistent leucocytosis in pernicious anæmia is kidney mischief. In cases with a persistent leucocytosis it would probably be wise to trust to liver extract alone, which contains no protein, and not to give the large quantities of red meat advocated in Minot's original diet. These observers soon discontinued their practice of giving arsenic as well as liver, but they believe **Hydrochloric Acid** to be of value in improving appetite, and hence it may be used in combination with liver therapy.

J. Huston[15] draws the following conclusions from his observations on the diet rich in liver for the treatment of pernicious anæmia. Twenty-nine out of thirty cases of pernicious anæmia developed remissions on this diet. The remission persists for a period as yet undetermined if the diet is continued, but a relapse is to be expected if the diet is discontinued for very long. Evidence of bone-marrow regeneration is given by the increase in reticulated, stippled, polychromatophilic, and nucleated red blood-cells, and of decreased blood destruction by the progressive fall in the amount of blood bilirubin. The achlorhydria persists during the remission. The renal status should be considered in both the primary and secondary anæmias when placed upon this diet. The latter recommendation is important, as there is a certain amount of risk in the indiscriminate use of this diet on their own initiative by individuals suffering from anæmia, in view of the high protein content of the diet.

I. C. Brill[16] submits observations suggestive of a specificity of the Minot-Murphy diet in pernicious anæmia. A comparison is drawn between the results in ten cases of pernicious anæmia and four of severe secondary anæmia. In the latter the cause of the condition was removed before the diet was commenced, except in a case of gastric carcinoma without obstruction, where the patient was able to take the full diet during the whole period of observation. In the pernicious anæmia group there was a steady, uniform, and rapid rise in both hæmoglobin and red blood-cells. In the secondary cases there was a slight rise in hæmoglobin and cells only in three cases in which the cause of the anæmia (hæmorrhage) was removed by operation before the diet was begun; no change at all was noted in the case of inoperable carcinoma. While no definite conclusions can be drawn from the study of a comparatively small group of cases, the results are nevertheless suggestive. The uniformity with which the pernicious anæmia series responded to the diet, while four consecutive cases of secondary anæmia treated under exactly the same condition failed to show a similar response, is highly suggestive that the diet used furnishes a therapeutic principle specific for pernicious anæmia. These considerations, Brill argues, appear to justify a theory that pernicious anæmia is due to a lack in the body of a necessary metabolic substance bearing a relation to this disease not unlike the relation which insulin bears to diabetes, and that this substance is partially supplied by the Minot-Murphy diet.

P. Starr[17] reports his results of liver feeding in ten cases of pernicious anæmia, and states that it is uniformly followed by recovery from anæmia. This process is accompanied by two unique features—rapid decrease of bilirubinæmia, and transient, sometimes marked, increase of reticulocytes. Anæmia returned in one case at the end of ten months when liver was discontinued. Ten cases under observation from three to fourteen months now show no evidence of anæmia. Advanced spinal-cord degeneration is not altered by this recovery of the blood. The recurrence of glossitis and anæmia when liver feeding was discontinued at the end of eleven months indicates that the underlying pathological condition is still present.

The aversion to liver as an article of food is often imaginary, but may be a real difficulty. For these reasons ingenuity in preparation is advantageous. Thin raw liver sandwiches, with lettuce, cress, cucumber, are palatable, and are often taken freely and with relish by patients. Raw liver pulp can be taken with a little Worcester or other strongly flavoured sauce. The following recipes were taken from English, French, and other sources and reprinted in the *Journal of the American Medical Association*[18]:—

French Recipe.—1 pound of liver; 1 slice of bread grated—this means grated, not crumbled; 1 tablespoonful chopped parsley; ½ teaspoonful of salt; ¼ teaspoonful of pepper; a very thin slice of ham. Wash the liver well and cut into thin slices; put into casserole; sprinkle the breadcrumbs over it, then the parsley, pepper, and salt. Cut the ham into strips and lay it on top, then pour in one teacupful of cold water. Bake in oven for half an hour.

English Recipe: Liver Moulds.—Take one pound of liver, boil it, and grate it with three strips of bacon. Mix it with about one-fourth of the amount of breadcrumbs, the yolks of two eggs, and seasoning to taste. Steam in buttered moulds.

Scottish Recipe: Larded Liver.—Take a lamb's liver and lard it in rather close rows, covering the whole upper surface. Place it in a deep casserole with chopped onions, carrots, slices of fat bacon, salt, pepper, and sweet herbs (sage, etc.). Cover with water or a good soup stock. Cook in a moderate oven for forty or fifty minutes. Turn out on a hot dish. Thicken the liquor slightly with flour and butter, adding a small amount of lemon-juice and paprika.

Canadian Recipe: Mock Duck.—Take a fresh calf's liver and stuff with duck dressing (sage and onions, which should be parboiled before being mixed with the other ingredients). Put the stuffed liver in a pan, cover with strips of bacon, and bake for two hours, basting frequently with the fat from the bacon strips.

J. H. Anderson and E. I. Spriggs[19] report two cases of the use of the Minot-Murphy liver diet in Addisonian anæmia. The favourable results were immediate and marked. One case was that of a medical man who had previously experienced three remissions, but he had no doubt that his recent improvement had a character of its own. The dietetic treatment may be summarized as

Mammalian liver essential: Calves', beef, pigs', from 90 to 240 grm. (3 to 8 oz.) cooked weight daily. *Encourage*—(1) Kidneys. (2) Chicken livers. (3) Red meat (without the fat): beef, lamb, mutton, calves' or ox heart. (4) Fruits (fresh, tinned, or dried) up to 12 oz. a day: oranges, grapefruit, raisins (steam until soft before serving), prunes, strawberries, peaches, apricots, or pineapple. (5) Vegetables (cooked or raw): lettuce, cabbage, spinach, tomatoes, asparagus, or other vegetables. *Permit*—One egg, milk (half a pint), tea, cocoa; toasted wholemeal bread, plain biscuits; potatoes, macaroni, cereals; sugar, not to exceed 20 grm. (⅔ oz.) a day; pickles, relishes, salt, and vinegar; poultry, fish, shell-fish. *Avoid*—Fats (not to exceed 70 grm. (2½ oz.) a day); bacon, pork; butter, cream; cheese; oils, olive oil in dressings, etc.; nuts.

Two full days' diets were as follows:—

Diet 1.—*Breakfast:* Fruit-juice; porridge; boiled egg; toast, butter; marmalade; coffee, milk.

11 a.m.: Raw beef and liver sandwiches.

Lunch: Fried liver, onion, and tomatoes; macaroni; spinach; salad; fresh fruit; toast.

Tea: Biscuit; jam; fruit; fruit salad and raisins.

Dinner: Vegetable soup with scraped raw liver; underdone chop or steak or liver; rice pudding with raisins; orange salad or fruit.

Diet 2.—*Breakfast:* Fruit; porridge; toast, butter; coffee, milk.

Lunch: Fried liver; tomato, onion; green vegetables; rice pudding with raisins, stewed fruit; toast, butter; milk.

Tea: Biscuits; jam; fruit; tea and milk.

Dinner: Vegetable soup with raw scraped liver, fish, meat, or liver dish; green vegetables; milk pudding; stewed or fresh fruit.

W. T. Wilkins[20] presents a *liver cocktail* which has a true American flavour, and which he states has been served with success to healthy people at dinner as a summer cocktail instead of oyster. This American rarebit is prepared thus:—

Liver.—Locate a market where fresh choice calf's liver may be obtained. Place a standing order for a delivery every other day. As soon as each order is received at the kitchen, trim off the 'skin' around the edges, and carefully remove all the veins and tough parts with a sharp knife. Rinse in cold water. Put the prepared liver through a meat grinder twice, using the finest cutter. Place it on ice immediately. Half a pound of liver makes four tablespoonfuls of crushed product.

Sauce.—Prepare a sauce as follows: Tomato catchup (Heinz) ½ cupful; lemon juice ¼ cupful; Worcestershire sauce 2 tablespoonfuls; chives (finely chopped) ½ teaspoonful; salt and pepper to taste.

Cocktail.—Mix the liver and sauce in the proportion of one part crushed liver to two and a half parts of sauce. Chill thoroughly and serve in a cocktail glass with salt crackers or wafers.

Administration.—As for olives and oysters, so also with liver: a person will acquire the taste. In a few days the amount offered, which at first should be very small, may be increased until the patient readily accepts two cocktails daily, each of from two to four tablespoonfuls of crushed liver. It is essential that the following recommendations be strictly adhered to: Every tough part must be carefully removed and the liver finely ground; the cocktail must be served cold and eaten with crackers; and time must be allowed each patient to 'develop a taste' before large amounts are offered.

Useful recipes were included in the article on pernicious anæmia in the Medical Annual, 1928, pp. 331 et seq.

of pernicious anæmia with liver. The common leucocyte blood picture in pernicious anæmia is a leucopenia with a relative lymphocytosis—a picture common to many chronic intoxications. Adequate liver diet appears to stimulate the production of leucocytes so that the leucopenia is abolished. The observations were based on a study of four cases. In two of them the relative lymphocytosis disappeared and the differential count became normal except for a transient but definite eosinophilia. Eosinophilia was found in all four cases and seems to be a part of the patient's reaction to the treatment: the transient nature of the phenomenon points to a parallel between the reticulocyte reaction and the increase in eosinophils. The occurrence of eosinophilia may lead those who are unaware of the phenomenon to suspect wrongly a parasitic affection derived from the raw liver diet.

Subacute Combined Degeneration.—A reference was made in the latest report of Minot and Murphy[22] to the effect of the liver diet on the manifestations of this spinal disorder when associated with the anæmia. Subjective improvement mainly occurred, but, as a result of improved general condition and muscular power, the patient was able to walk better, and re-education exercises made further progress possible. There was little or no alteration in the physical signs of the nervous disease. It is probable that early diagnosis and prompt treatment with liver may prevent, or at least delay, the onset of the nervous affection. When sclerosis is already present, little or no change can be expected from the treatment.

A. E. Cohen[23] reports a case in which, while marked systemic improvement resulted from the Murphy-Minot diet, the patient not only showed no improvement in the neurological condition, but developed a pronounced ataxia and other distressing nervous symptoms during an otherwise favourable remission. The case was one of average severity with glossitis and achlorhydria. The patient was given a general treatment, including the ordinary medicinal agents and a high caloric diet. He was not again seen for about six months, when he returned complaining of numbness and tingling in the fingers, but had otherwise improved considerably. The Minot-Murphy diet was now advised, but was not observed. He was next seen in a severe relapse six months later, and received an immediate blood transfusion and was put on the liver diet. Marked general improvement ensued and was maintained for almost a year. The cord symptoms had in the meantime progressed and evidence of posterolateral sclerosis was now complete. Cohen remarks on the progressive character of the combined sclerosis despite the enjoyment of a distinct general remission. It will be seen, however, from the report that the liver diet was not commenced for about a year from the time when he was first seen, and soreness of the tongue had been present for a year previously.

E. H. Mason,[24] in a report on a case of pernicious anæmia treated with a high liver diet for almost four years, records a marked improvement in the condition of subacute combined sclerosis which was present from the onset. During the last year practically all subjective symptoms had disappeared, although the patient was conscious of a weakness of one leg. Objectively the deep reflexes had returned, but a slight bilateral extension persisted. The gait had improved greatly, but it was found that slight Rombergism on standing still persisted.

H. M. Bubert[25] reports a case of pernicious anæmia which was early associated with subacute combined sclerosis. The case was observed over a period of almost five years, and ill health and early symptoms of the nervous disorder had existed for several months previously. The course was steadily downwards for about three years, except for periods of temporary improvement, and the nervous affection had become well advanced, ataxia and absent knee-jerks being the prominent signs. He was unable to walk except with the aid of two sticks. An immediate and marked general improvement followed the introduction of the liver diet. Ataxia quickly disappeared, the knee-jerks returned and became active, the plantar reflexes were now flexor (but there was no note of the former response to plantar stimulation), and four months later he expressed himself as being quite well, except for numbness and tingling of the lower extremities.

Mental State.—A. G. Hulett[26] discusses the psychological and medico-legal aspects of pernicious anæmia. Although infrequent by comparison with spinal-cord lesions, yet cerebral lesions are by no means rare in the disease. Various psychotic states are encountered, including apathy, loss of memory, delirium, disorientation, social confusions, gradual mental deterioration, melancholia, paranoia, and even maniac delirium. Mental disturbance may sometimes precede the apparent onset of the anæmia, and also, because the common mental defect is of the paranoid type, its real nature may easily escape detection. In a typical paranoid case the determination of the patient's mental and testamentary capacity is not difficult, but in the ill-developed, mild, or mixed case a very real problem is presented.

Cardiovascular System.—A reference was made in the MEDICAL ANNUAL, 1928, p. 330, to a contribution by Carey F. Coombs on the occurrence of *cardiac pain* in pernicious anæmia. F. A. Willius and H. Z. Giffin[27] found in a study of 1560 cases of pernicious anæmia that 43 (2·7 per cent) gave a history of angina. The average age of the patients was 53·5 years, and 56 per cent of them were between 50 and 60 years of age. There were almost twice as many males as females. The anginal syndrome differed subjectively in no essential way from that of angina pectoris. Radiation of the pain was less frequent, and agony was continuous in the severest cases of angina. The anginal syndrome occurred chiefly in cases of long duration. Objective examination of the heart showed no significant changes save those secondary to anæmia. The degree of anæmia did not bear a direct relationship to the occurrence of angina. Electrocardiographic examinations showed no significant abnormalities. In one necropsy only fatty myocardial changes were found. There was no aortic or coronary sclerosis. In fifteen necropsies of other patients with pernicious anæmia the average age was 53, and only three showed aortic and coronary sclerosis. The anginal syndrome in pernicious anæmia is due presumably to anoxæmia of the myocardium, and not to coronary or aortic sclerosis.

J. Lerman and J. H. Means[28] have studied the *blood-pressure* in pernicious anæmia, and conclude: "Analysis of the blood-pressure in 500 cases shows only slight variation in the averages due to age or sex. Compared, however, with average figures for normal people, it is significantly lower. The incidence of systolic hypotension in the series used as controls varies from 2 to 3 per cent, and of diastolic from 0·3 to 1·6 per cent. The incidence in our series of pernicious anæmia patients is about 11 per cent for systolic and about 30 per cent for diastolic hypotension. These percentages corrected for the age distributions of the controls are still higher. Hypotension is a more frequent condition in pernicious anæmia than in tuberculosis. The incidence of hypertension in the accepted risks of life insurance companies is somewhat lower than in miscellaneous material or private patients—5 to 7 per cent and 10 to 15 per cent respectively. Its incidence in the general population must lie between these percentages. On the other hand, in our pernicious anæmia series we find systolic hypertension in about 2 per cent and diastolic in about 0·15 per cent of the cases. Analysing our cases from both points of view, we find only 1 case definitely of arterial hypertension, and 2 more which may possibly be that.

"It appears that in pernicious anæmia hypotension is associated with an almost complete disappearance of hypertension, whereas in tuberculous patients the existence of hypotension has little effect on the frequency of hypertension. The infrequency of hypertension in pernicious anæmia impresses us as of distinct interest, being practically as rare as is the presence of free hydrochloric acid in the gastric juice. But, of course, until further control data on other anæmias have been secured, no diagnostic weight can be laid on blood-pressure. The pulse pressures in pernicious anæmia are higher than the corresponding normal ones by 9 to 17 mm. of Hg. This increased pulse pressure is apparently a feature of an increased volume flow of blood of a compensatory nature, and finally results in hypertrophy of the cardiac musculature. With improvement in the blood picture the pulse pressure tends to diminish."

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ANÆSTHESIA.

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RECTAL ANÆSTHETICS.

As a rectal anæsthetic, Avertin (E 107), tribromethylalcohol, which was introduced in 1927 by Willstätter and Duisberg, has been very extensively used during the last year, and its position as an anæsthetic has been made clear by a large number of articles by various authorities.[1] The outcome of these diverse opinions[2] may be summarized as follows: Avertin should not be used with the idea that it will certainly provide by itself a perfect anæsthesia for operations which demand complete muscular relaxation. In many instances deep anæsthesia with avertin alone can only be achieved by using the drug in a dangerously high concentration. On the other hand, when it is used in a safe solution—i.e., a 3 per cent solution containing 0·1 grm. avertin per kilo of the patient's body-weight—then it can be relied on to procure the quiet induction of a degree of narcosis which will in many cases permit operation without further anæsthetic, and in the rest will give a perfectly satisfactory anæsthesia with the help of little additional inhalation anæsthetic. It is in fact to be regarded as a very valuable 'sub-anæsthetic'. Naturally the best results can only be obtained after considerable experience in the use of the drug. There are features in the narcosis which it procures which are peculiar and which render it deceptive to the uninitiated. The sleep brought about by avertin appears deeper than in some respects it actually is, and the ordinary criteria—for example, the eye reflexes—are not trustworthy guides. Usually the onset of this sleep is remarkably quiet, is pleasant to the patient, and is entirely undisturbed by mental or muscular excitement. One author,[3] however, describes violent excitement and screaming during the early stages of the injection. His experience, however, appears to be unique, and is attributed by others to the employment of too weak a solution. With alcoholic patients, nevertheless, some excitement has been commonly observed before the onset of narcosis.[4] The respiration is often slowed as well as diminished in depth, and cyanosis may be seen if due attention is not paid to keeping the air-passages unobstructed. The force of the circulation is well maintained, only slight, if any, fall in blood-pressure being common. The narcosis of avertin lasts usually about three hours. The drug is eliminated by the kidneys after combining with glycuronic acid in the liver.[5] So far there have been no deleterious after-effects ascribed to its use, either immediate or remote. It does not cause vomiting.

The manufacture of avertin has to be conducted with great care, and this applies also to the preparation of the solution for injection. Tribromethyl-alcohol is a white crystalline salt easily dissolved in water. It has a melting point of about 80° C. and a much higher boiling point. When heated to boiling point or less it is easily decomposed and dibromacetaldehyde is formed. This body is a severely irritating poison to the intestine and can cause colitis with necrosis. It is chiefly to avoid the risk of producing this substance that care is required in the making and storage of avertin and in preparing the solution for clinical use. This preparation is best carried out shortly before the injection is to be made. The powder is kept in a yellow bottle in a cool place. Distilled water is used for the solution, and is warmed to 45° C. Enough is taken to make a 3 per cent solution, and the dose is calculated according to the body-weight (*see above*). Nordmann holds that it is a safe plan to give 6 to 8 grm. for women and 8 to 10 grm. for men as a general maximum dose. Thus, for a woman, 6 grm. would be dissolved in 200 c.c. distilled water at 45°. The solution takes some time and constant shaking to effect. It is given through a soft rectal tube inserted about four inches, the patient lying on the left side. Before giving it the test with Congo-paper must be tried. If the paper turns blue when wetted with the solution, there is danger and the injection should not be made. It is believed that the solution does not keep, and should be made within twelve hours of use. However, the writer has kept a solution for several days in a cool, dimly lit room and found it unchanged.

When the injection is made it is to be slowly carried out. At least ten minutes are to be spent over it, the best plan being to run the solution in through a funnel attached to the rectal tube and held a foot or so higher than the distal end. Absorption starts at once, and about half the whole amount is absorbed ten minutes after it has reached the rectum, and three-quarters of the whole after twenty minutes. That the entire amount put in is eventually absorbed has been shown by washing out the rectum on the patient's return to bed and finding no avertin in the wash-out. A preliminary hypodermic injection of **Morphia** or **Omnopon** is recommended by most authorities, as well as a dose of **Chloretone** the night before; these measures must naturally vary with the individual patient. In any case care must be taken that the rectum is clean, a simple water wash-out being used for this purpose an hour before the injection is made, when the hypodermic, if used, is also given. After the injection has been given, a tampon of cotton-wool well smeared with boracic ointment is applied outside and just within the anus. When the patient returns to bed the rectum is washed out with water and a little olive oil inserted.

A. Nehrkorn[6] has used avertin with success on an infant of 2 months and on a patient of 84 years. Generally speaking, young adults are the most resistant to its action. Probably the best field for avertin will prove to be extensive operations about the head and neck, particularly advanced cases of cancer treated with diathermy. The great advantage of having no inflammable anæsthetic in the breath places avertin in a position superior to ether. Moreover, in the cases alluded to intratracheal ether is generally inadvisable from the position of the growth as regards passing the catheter. Avertin, too, should prove of great value[7]—indeed it has already proved so—for patients with Graves' disease, and as a preliminary with most nervous or highly emotional patients. The great difficulty is correct dosage. Obviously mere body-weight is an insufficient guide to the correct amount of a narcotic substance to employ on the body of a patient whose mental attributes decide so largely his reaction to drugs of this kind. At present the anæsthetist must play for safety and use the 0·1 grm. per kilo of body-weight, supplementing with inhalation as he finds necessary. Professor E. Martin[8] recommends that in order to achieve full anæsthesia with avertin it should be associated with hypodermic injections of **Scopolamine** or **Narcophen.**

Ether-oil Drop Narcosis.—Under this title Professor H. Matti,[9] of Berne, describes what he considers a greatly improved method of rectal ether administration. His procedure is: (1) One hour before operation **Tinct. Opii** and **Allonal** in 10 c.c. of water per rectum, the dose of the drugs varying with age, etc.; (2) Half an hour later an enema composed of **Ether** and **Olive Oil**, 2 c.c. of ether per kilo of body-weight, and half the quantity of oil; (3) At the beginning of the operation 4 c.c. of ether per kilo of body-weight of the patient, with an equal quantity of oil, are run in slowly, and generally he has not found it necessary to use the whole amount. The amount of ether absorbed, when the method of oil-ether colonic anæsthesia is employed, is estimated at about 2 oz. of ether per hour, which of course is much lower—in fact, about one-third—than what is generally required by inhalation.[10]

J. W. Hinton,[11] at the New York Post-graduate Hospital, has been highly satisfied with the ether-oil colonic method for operation on *exophthalmic goitre* patients. His technique involves the preliminary hypodermic injections of **Morphia** and a preliminary rectal injection of **Chloretone, Ether,** and **Olive Oil.**

R. A. Hatcher,[12] professor of pharmacology at Cornell, in a very comprehensive article, makes some pertinent criticisms of the data on which Gwathmey based his ether-oil method, and also of the much-vaunted 'synergistic analgesia' for childbirth. He points out that ether does not evaporate at a uniform rate from oil, as Gwathmey claimed, and that the rate of absorption is not uniform. Hatcher's conclusions agree with the clinical observations of most of those who have used the rectal method. He believes that the most suitable mixture for inducing anæsthesia by rectal instillation is one of equal volumes of ether and olive oil.

Colonic anæsthesia for operations on the brain and spinal cord is warmly recommended by C. H. Frazier,[13] who holds that "colonic anæsthesia seems to have its outstanding indication in laminectomy". His article is based on 17 cases of operation on head or spine.

Treatment of Tuberculous Peritonitis by Ether Anæsthesia.—The good results of opening and shutting the abdomen in cases of tuberculous peritonitis are familiar, and various explanations have been offered for the good results. Alteration of abdominal tension, exposure to the air, etc., have been suggested, but hitherto apparently the possible influence of the anæsthetic has been ignored. W. E. Savage,[14] seeing in this overlooked factor a possible cause for the improvement effected by merely opening the abdomen under anæsthesia, decided to try the effect of anæsthesia without operation. He has now a record of 7 cases of general tuberculous peritonitis treated by **Ether Anæsthesia.** Of this number 6 patients recovered. One did not improve. This youth was then operated on. The tubercles in the abdomen were large and caseating, and in places formed great tuberculous masses. The abdomen was closed without drainage and the boy died about a month later. In the other six cases improvement started almost directly after the ether anæsthesia. The patients were given ether to inhale from thirty to fifty minutes. In three of them when progress appeared to be arrested a second administration was carried out. Savage believes that the earlier in the disease ether is employed the better, and that if anæsthesia does not bring relief nothing will.

Scopolamine in Obstetrics.—Bertha v. Hoosen[15] pleads warmly for the use of **Scopolamine** alone as the narcotic in labour. She gives doses of $\frac{1}{100}$ gr. every half-hour for three doses from the beginning of labour pains, and goes on with doses of $\frac{1}{200}$ gr. every two hours. She states that by this means the patient is kept free from all pain, and that there are no deleterious effects on mother or child. In fact she declares that the force and frequency of the fœtal heart are increased. The uterine contractions are not inhibited or diminished. The amount of restlessness sometimes displayed by the patient is easily controlled by loosely fastening the wrists and the knees. (*See also* LABOUR).

Preliminary Medication.[16]—This is stated on experimental grounds to abolish the risk of lung damage from inhalation anæsthetics. Some 500 animals were used in the course of a year's experimental work. The lungs of those subjected to anæsthetic gases showed perivascular œdema, diffused petechiæ, alveolar spaces filled with fluid, and bronchi with œdema. The lungs of the animals that had received preliminary medication were relatively normal.

Ether Convulsions.[17]—The late S. R. Wilson's contribution to the *Lancet* of May 20, 1927, p. 117, has aroused much interest in this subject, and the phenomenon was thoroughly debated at a discussion started by C. F. Hadfield.[17] Wilson's explanation of these occurrences, which were unknown till quite recent years, was that they depended on impurities in the ether used. The convulsions have occurred generally in patients already toxic, and Wilson's patients were all young. He concluded from examinations of the ethers used that acetaldehyde and peroxide were the causative agents. Hadfield shows that this explanation does not cover every case. He brings forward a case from St. Bartholomew's in which ether from the same batch as that administered to the convulsed patient was perfectly pure. Of course it does not follow that impurity might not have arisen in the particular quantity of the liquid used for the patient. Hadfield regards heat in some form or other as the one definite factor the presence of which is established in all cases. The phenomenon has appeared in the warm months of the year, or warmth has been supplied to the ether used. He shows reason to discount various other explanations that have been offered—e.g., excess of CO_2, deprivation of oxygen, overdose of atropine, etc. The causative effect of acetaldehydes and peroxides as the origin of these convulsions is supported by a case related by A. C. R. Walton.[18] These impurities were shown to be freely present in the ether used. His patient gave every appearance of suffering from "severe and continuous irritation of the central nervous system", and evidently there was present "some toxic product which was not eliminated from the system as rapidly as ether, hence the post-operative convulsions". In this case the convulsions were controlled by **Bromides** and **Chloral**, and the patient recovered after several severe convulsive attacks both during and after the operation, which was for pneumococcal peritonitis in a child.

Spinal Analgesia.—A well-balanced account of the present position of spinal analgesia was given by Cecil Hughes[19] at the Royal Society of Medicine. He always precedes the injection by a hypodermic of **Morphia** $\frac{1}{8}$ gr. and **Atropine** $\frac{1}{200}$ gr., and injects a solution of 5 per cent **Stovaine** with 10 per cent **Caffein Citrate** and **Sodium Benzoate** in distilled water. Employing the Trendelenburg position, he rarely meets with severe fall of blood-pressure, and serious after-effects do not occur. Needles and syringe are kept in absolute alcohol. After use they are rinsed with distilled water and returned to the alcohol. Before use they are washed through with the stovaine solution. An increasing pulse-rate during operation is to be regarded as the most important danger signal. In 500 cases he met with two instances of paralysis of the ocular recti muscles which lasted some weeks. Also there was one case of paresis of the bladder with anal analgesia lasting two months. C. F. Hadfield[19] related a case in which death appeared to be due to spasm of the smaller bronchioles. Air could not be made to enter the lungs by artificial respiration, nor could oxygen be administered by forcible ventilation through an endotracheal catheter.

Anæsthesia in Obstetrics.—This subject was discussed at a meeting of the Royal Society of Medicine.[20] Eardley Holland gives 30 gr. of **Chloral** in a tumbler of water by sips during the first stage of labour when pains begin to trouble, or else a dose of **Morphia** and **Scopolamine.** He holds that no morphia should be given within two hours of the birth of the child for fear of paralysing the infants' respiration. When the second stage is reached he gives **Chloroform** from a Junker's inhaler, which may be worked by the nurse or even by the patient herself. A stage of light narcosis is maintained, the administration being intermittent, and withheld entirely between the pains. In this way the force and frequency of the uterine contractions are very rarely diminished. As the head passes the vulval outlet the narcosis is deepened to true surgical anæsthesia. J. Blomfield recommended **Nitrous Oxide** and **Oxygen** intermittently, starting early in labour, and preceding the gases by an injection of **Morphia** and **Scopolamine.** When the head is stretching the perineum to the uttermost, **Ether** must generally be added. He thought that every normal labour should be made painless, and that 'gas and oxygen' interfered less than any other anæsthetic with the metabolism of mother and child. W. Gilliatt gave details of five cases in which severe illness ensued, due in his opinion to delayed chloroform poisoning. In each case two separate anæsthetics had been necessary at intervals of from twelve hours to five days. The second anæsthetic had on each occasion been chloroform, and he had now refused to permit the use of this anæsthetic in similar circumstances.

The effect of anæsthetics on hepatic function has been investigated experimentally.[21] The conclusions reached by S. R. Rosenthal and Wesley Bourne were :—

1. Brief periods of chloroform anæsthesia are sufficient to produce immediate and delayed toxic effects on the liver. Half an hour of chloroform inhalation can cause injury that requires eight days for functional recovery, while two hours of anæsthesia needs six weeks for the return to normal. Disturbance of function could be demonstrated with the bromsulphalein test long after pigment metabolism had returned to normal.
2. Ether produces a definite but transitory impairment of function. Recovery is usually complete in twenty-four hours.
3. Nitrous oxide and ethylene administered through a mask did not produce any change in the bromsulphalein test for hepatic function or any disturbance of pigment metabolism.
4. Nitrous oxide and ethylene given in a closed chamber with poor oxygenation caused both immediate and delayed toxic effects on the liver.
5. Cyanosis in itself increases the toxicity of anæsthetics for the liver.
6. Large doses of morphine in dogs cause considerable depression of function, with complete recovery in twenty-four hours.
7. Ethylene would seem to be the anæsthetic of choice for operations in severe liver disease.

In drawing attention to *factors reducing mortality in nitrous-oxide-oxygen anæsthesia*, G. A. Haveman[22] emphasizes the importance of insisting on the absence of any infection within the chest or upper air-passages. If there is "any coryza or even the feeling of impending cold" the operation should be postponed. There is no doubt that a number of post-operative illnesses are due to infection already present when the anæsthetic was taken, the lowered resistance due to operation and anæsthesia providing the invading germs with full opportunities to exercise their malignant influence. Consequently scrupulous examination of the patient beforehand is a first step towards immunity from post-operative trouble. The writer believes that there can be no danger at operation under gas and oxygen as long as the patient's colour is good. He believes, however, that the heart will sometimes dilate while the patient is going under the anæsthetic, and that this may account for some fatalities both at and after operation.

E. I. McKesson[23] relates interesting instances in which *administration of gases under pressure* was of use not only in preserving the patient, but in locating the trouble and making a diagnosis. Two examples were in the subjects of bronchial fistulæ, and in one, after a perinephric abscess had been opened by the surgeon, pus was aspirated into the mouth from the abscess cavity by reason of a fistula communicating into the right bronchus. By increasing rapidly the pressure of the imbibed gases the anæsthetist was able to force the pus back out of the air-passages. Both the patients alluded to recovered.

Nitrous oxide and oxygen for children of any age is extolled by D. A. Wood,[24] who gives details of a series of 200 cases in which the ages of the patients ranged from 11 months to 10 years. It is a familiar fact that children often require repeated anæsthetics—e.g., in orthopædic surgery. It is a great advantage in these circumstances if an innocuous gas, nitrous oxide, can be employed. The author describes the technique as being in no way different from that with adults. He used either the Ohio monovalve or a McKesson machine. Pale children require generous proportions of oxygen with the nitrous oxide. There is no doubt that the old idea of refusing gas and oxygen to young children depended on the comparatively inefficient apparatus then employed. With good, easily working valves young children can take 'gas and oxygen' easily and safely. The first point to remember is that these small patients more easily suffer cyanosis and jactitation than adults, and all asphyxia must be prevented by free oxygen admixture.

The Choice of an Anæsthetic.—Gilbert Brown[25] rules out **Endotracheal Ether** in three classes of case: (1) Exophthalmic goitre patients, because of the primary deep narcosis needed for passing the catheter; (2) Cases of empyema; (3) Cases of epithelioma of the tongue in which there is much ulceration and sepsis. In these cases he regards laryngotomy and administration through the laryngotomy tube as much safer. He regards **Chloroform** as permissible only in four circumstances: (1) In the presence of a flame or actual cautery; (2) Where there is extensive inflammation of submaxillary and cervical region (Ludwig's angina); (3) In people suffering from acute lung disease; (4) In patients who have an idiosyncrasy against ether.

Intravenous administration of general anæsthetics has never found much favour. Nevertheless J. Sénèque[26] describes a new and complicated procedure for which he claims great advantages with the anæmic, the shocked, and the cancerous patient, and all those who are suffering from acute peritonitis or ruptured ectopic gestation. The method requires two persons for its performance—one to take charge of the patient, and the other to occupy himself entirely with the intravenous injection, for the composition of the solution used is varied from time to time according to the patient's condition. The preparation of the solution is no simple affair; there are, in fact, three separate solutions which are used concurrently. These consist of **Isopral**, **Ether**, and

Artificial Serum. They are placed in graduated flasks from which three easily sterilizable tubes converge into one (*Fig.* 3). Isopral is a white crystalline powder of the chloral group. To make the isopral solution over 2 litres of distilled water are heated to boiling point for an hour and a half. After being allowed to cool, the remainder is reduced to exactly 2 litres. To this are now added 20 grm. of normal serum and 30 grm. of isopral. The 1½ per cent solution of isopral thus obtained is placed in a water-bath at 30° C. in which it is kept for fifteen days at constant temperature. The solution remains sterile owing to the bactericidal powers of isopral, the active properties of which are not diminished during the lapse of time. Solutions of four months' standing have been employed. The ether solution, on the other hand, is to be prepared just before use, and is 5 per cent strength with normal serum, heated to 28°, and shaken. In a third flask is placed about a litre of artificial serum. The injection, which must be continuous to avoid thrombosis, starts with the isopral solution alone. The flasks are put at a level about 50 cm. above the patient, and during the first minute about 50 c.c. are allowed to flow in. The maximum amount of this solution allowed is 200 c.c., representing 3 grm. isopral. Generally 100 c.c. are enough for a woman, 180 c.c. for a man. In about two minutes, that is, anæsthesia is reached, with an absent corneal reflex. The action of isopral lasts only about ten minutes. Directly, therefore, the patient is fully asleep with it the ether solution is allowed to run in in place of the isopral. Respiration, pulse, and pupil must then guide the anæsthetist as to when to make the flow merely one of drops. When the operation is on the point of ending the ether is stopped, and the artificial serum introduced in its place.

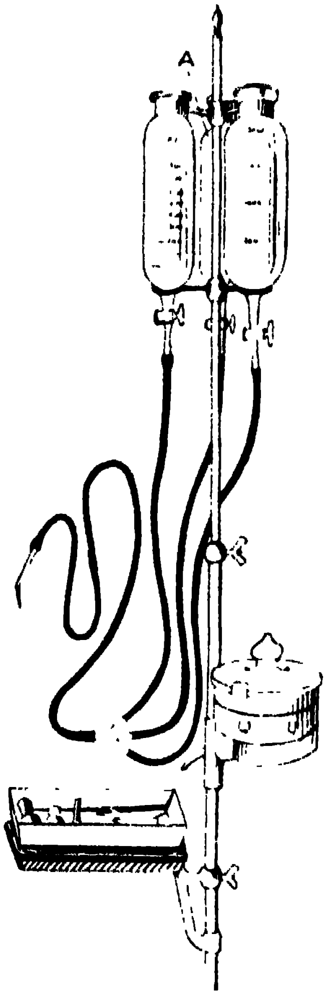

Fig. 3.—Apparatus for intravenous administration of isopral and ether. A = isopral. (*Redrawn from 'La Presse Medicale'.*)

A method of *intratracheal inhalation and insufflation of chloroform* through a flexible metal catheter is described.[27] The catheter is rigid at either end for about two inches, the rest being flexible. An adapter permits of the fitting on to the catheter of the exit tube of a Junker's apparatus. There are side openings in the catheter both at its internal and external end. The latter is entirely outside the mouth so that its side opening can be at will closed or left open. A stilette is used within the catheter to facilitate its introduction through the glottis after the patient has been anæsthetized. The writer removes the pump from the Junker when the catheter is in position and the pharynx packed around it, and allows the patient's breathing to draw in chloroform vapour or air according to the closing or opening of the orifice in the side of the catheter.

Anæsthesia for operations on the upper abdomen is the subject of a paper by H. Torrance Thompson[28] which covers the ground very thoroughly and shows excellent judgement. The author includes 86 cases of *splanchnic analgesia*, Although he finds that shock is reduced, respiratory complications not nearly so likely to occur, and post-operative vomiting lessened, yet as regards operative facility the method appears inferior to endotracheal insufflation of **Ether.** The latter is on the whole the most satisfactory procedure in the author's estimation. He does not find advantage in nitrous oxide intratracheally. He thinks it probable that in high abdominal operations there will be an increasing tendency to the employment of a combination of some form of regional with light anæsthesia. This, incidentally, has become with many operators the routine method for big operations on the lower abdomen and pelvis—e.g., Wertheim's hysterectomy and abdominoperineal resections of the rectum, which are commonly carried out under spinal analgesia plus light general anæsthesia.

J. K. Hasler[29] gives a good condensed account of the treatment of *emergencies in anæsthesia.* He divides these into (1) partial or complete stoppage of respiration, and (2) failure of the circulation. Either of these phenomena may be nervous in origin. Whether the circulation stops first or the breathing, the other will stop also unless remedial measures are quickly taken. Interference with nervous control of respiration may follow on toxæmia from anæsthetic overdose, from anæmia, or from reflex inhibition. The treatment is to give **Oxygen** with 5 per cent **Carbon Dioxide**, and if necessary **Artificial Respiration.** Two drugs are useful in this kind of respiratory failure. They are **Strychnine** (gr. $\frac{1}{30}$) for its action on the motor cells of the spinal cord, and **Lobelin** (gr. $\frac{1}{10}$) for its powerfully stimulating effect on the respiratory centre.

Tonsillectomy with nitrous-oxide-oxygen anæsthesia, says M. Price,[30] can only be carried out by the use of a positive-pressure machine with nasal and mouth attachments. The time for removal of the tonsils was between thirty-six seconds and four minutes. Blood was removed by suction, no sponges or swabs being employed. Patients were fully conscious before leaving the theatre. They were all children. The writer prefers a light anæsthesia for these operations.

The use of carbon dioxide in anæsthesia has been so much advocated of recent years that its possible disadvantage and dangers should be carefully considered. This is well done for the reader by R. M. Waters,[31] who is especially sceptical as to the beneficial results of inhaling large percentages of carbon dioxide when the correct acid-base balance of the human body is kept in mind. "Any attempt to remove carbon dioxide from, or to add carbon dioxide to, a patient, other than to maintain the elimination of carbon dioxide at the level it occupied before anæsthesia, should be based on a definite knowledge that his acid-base balance was abnormal before anæsthesia started." The important thing is—can this balance be more carefully guarded in a given case by the addition of carbon dioxide, or by its complete or partial removal from the respiration medium? The answer in the normal case is given by graduated re-breathing, the patient being made to re-breathe such an amount of each exhalation as to make his actual tidal exhalation per minute equal to that which he maintained before anæsthesia. With ill people definite knowledge must be at hand as to the direction of the deflection from the normal. That carbon dioxide can raise the systolic blood-pressure and diminish the coagulation time of the blood is admitted. Whether these advantages and the respiratory stimulus afforded by increased amounts of carbon dioxide in the blood are always to be adopted with benefit to the patient must depend on the answer to those questions which, as shown by Waters, should be asked for every patient.

The effects of *general anæsthesia on the muscular activity of the gastro-intestinal tract* are so often a leading factor in the comfort or misery of patients after abdominal operations that the question is of no small importance. It has been studied by E. H. Miller[32] in connection with ether, chloroform, nitrous oxide, and ethylene. He finds that during surgical anæsthesia with ether or chloroform there is marked loss of tone and almost complete inhibition of both rhythmic and peristaltic contractions in stomach, small intestine, and colon. During the recovery period the stomach recovers slowly or continues to show some degree of depression for an hour or longer. The small intestine and colon recover very rapidly after stopping the anæsthetic. The small intestine develops exaggerated peristalsis, while the colon shows marked increase in tonicity.

Light surgical anæsthesia, such as that usually given by ethylene, causes no marked change in the activity of the gastro-intestinal tract. Nitrous oxide anæsthesia produces increase in the size of the contractions of stomach, ileum, and colon. This is probably due to anoxæmia. The effects of general anæsthesia on the gastro-intestinal tract are due chiefly to the action on intrinsic structures.

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ANAL FISTULA. (*See* FISTULA IN ANO.)

ANEURYSM. (*See also* VASCULAR SURGERY.)

Sir W. I. de C. Wheeler, F.R.C.S.I.

G. H. Colt[1] has added much information to the subject of the surgery of saccular aortic aneurysm. He has published a remarkable study of the clinical duration of this condition in British-born subjects. He quotes from every record of importance published in Great Britain during the last hundred years. He excludes 447 cases from the details of his report for various reasons, and includes 707 cases for statistical purposes. The total number of histories reviewed was 1202. Amongst his conclusions he mentions the high mortality between the ages of 40 and 45. In cases of aneurysm of the arch the patients' chances seem much smaller than of the ascending aorta in patients at this age. Both show a distinct increase of duration with increasing age; the expectation at 60 years being rather less than twice that at 35. Between the ages of 30 and 34 an aneurysm of the transverse portion of the arch appears to be very rapidly fatal. Abdominal aneurysm, he thinks, is chiefly a disease affecting males from 25 to 40 years of age. Female patients appear to live longer with an aneurysm of the ascending aorta than the male, whereas the male patient lives longer with an aneurysm of the transverse portion of the aorta than the female. Colt's paper is particularly useful for reference when trying to arrive at a prognosis with regard to the duration of life. His apparatus for the treatment of aneurysms of the aorta by wiring has been universally adopted.

TREATMENT BY WIRING.—The reviewer has wired three cases of abdominal aneurysm, and one case of thoracic aneurysm. The first case was recorded in detail in the MEDICAL ANNUALS of 1916, p. 107, and 1918, p. 240. The patient, age 38, was operated upon on Aug. 30, 1910. He died suddenly on March 31, 1928. At operation in 1910, a large saccular aneurysm in the region of the cœliac axis was found. A cage of 150 in. of Colt's wire was introduced. The aneurysm was cured and the patient was at work for seventeen years and seven months after the introduction of the wire. This is the longest survival recorded of a case of abdominal aneurysm. Unfortunately, no post-mortem examination was obtained, but the local doctor writes as follows: "I was called to see him on March 29, and found him in bed complaining of pain of a dull character in the right side of the abdomen and the right lumbar region behind. Examination revealed nothing except borborygmi in the abdomen. The aneurysmal swelling was not larger than previously, nor was the pulsation more marked. He had been constipated for some days. There was no abnormality of pulse or temperature. He refused to go to hospital and I gave him an aperient. On March 30 his condition was unchanged and he promised to go to hospital if he were not better in the morning. That night his bowels moved well and he got immediate relief from the pain. The next morning, March 31, he sent a message to me that as he felt quite well he would not go to hospital. However, while sitting up in bed he fell back, and when his wife reached him he was dead." At one period, several years after the introduction of the wire, it appeared as if the contraction of the aneurysm was tending to extrude the foreign body, and the points of some of the strands of wire could be felt under the scar. Later on, at one of the many periodical examinations, the wires had again disappeared. This attempt at extrusion of the wires is of interest in view of the following case.

Removal of Wire in Aortic Aneurysm.—A patient, age 40, was admitted to the Blackrock Ministry of Pensions Hospital in May, 1928, with an aneurysm protruding through the chest wall to the right of the sternum below the clavicle, which appeared on the point of rupture. The heart and aortic arch were shown by X-ray examination to be greatly enlarged, and on this account the case was by no means ideal for the wiring operation. It was thought, however, that rupture might be delayed by the introduction of the wire. A wisp of Colt's wire was introduced deeply into the sac under local anæsthesia on the 2nd of June. A month later the end of the wisp at the junction of the wires became superficial. On July 10 it protruded. The junction was nipped with pliers and all the strands of wire removed. The patient died on Sept. 6 (three months after operation).

PROGNOSIS IN ABDOMINAL ANEURYSM.—H. L. Farmer,[2] reporting on three cases, says that the prognosis in abdominal aneurysm is unfavourable. The duration of the condition varies from three months to three years. Heroic treatment with **Iodides** and **Mercury** has relieved the symptoms, but has produced no decrease in the size of the sac. Death usually results from rupture of the aneurysm.

REFERENCES.—[1]*Quart. Jour. Med.* 1927, April, 331; [2]*Amer. Jour. Roentgenol.* 1927, xviii, 550.

ANGINA PECTORIS AND CORONARY ARTERY DISEASE.

A. G. Gibson, M.D. F.R.C.P.

J. Parkinson and D. E. Bedford[1] have made a very important contribution to the subject of *cardiac infarction and coronary thrombosis.* They remark that "when a man of advancing years is seized while at rest with severe pain across the sternum which continues for hours and which is accompanied by shock, collapse, and dyspnœa, he has an anginal attack of no ordinary kind". Such a group of symptoms points to some event in the heart which is now very generally recognized as due to cardiac infarction. It is an arterial disease exactly comparable to cerebral thrombosis. Until recently the lesion has been associated with cases of sudden death, but, as in cerebral thrombosis, the patient frequently survives with a damaged cardiovascular system.

Parkinson and Bedford have investigated 100 patients who had suffered from one or more prolonged severe attacks of anginal pain in whom this was the most obvious diagnosis. They have also studied 83 post-mortem cases. Of these, 24 were brought to hospital dead, and of the rest, 62 suffered from cardiac failure. They find, as have others, that the greater number (90 per cent) are males; the maximum incidence occurs between the ages of 60 and 70. The onset of the main attack is abrupt, but there may have been antecedent substernal or brachial pain for days or months. In contrast to the rigid immobility seen during true angina pectoris, these patients are often markedly restless. The expression is anxious, ashen in hue, and there is perspiration. Vomiting is usual after the attack. Some degree of cyanosis and dyspnœa may occur. The temperature is normal, the pulse may be normal in rate, it may show extrasystoles, or more rarely a definitely irregular rhythm. The pain may last from a few hours to several days. **Morphia** only, not nitrites, relieves. There usually follows a slight fever for several days and a leucocytosis. Pericardial friction may be heard in the early stages. The patient may suffer an aggravation of symptoms and die, or he may gradually and slowly convalesce with improvement in all the signs. Subsequently there may be pain on exertion, some breathlessness, and occasionally congestive cardiac failure with œdema.

Thrombosis of veins may appear elsewhere, as in three of Parkinson and Bedford's cases of abnormal cardiac rhythms. Paroxysmal tachycardia, fibrillation, and flutter have been noticed, and both partial and complete heart-block. The electrocardiogram is characteristic and confirms the clinical symptoms. The interval between the R and T waves is not iso-electric, but either elevated or depressed. After a few weeks the T wave undergoes a deep inversion in Leads I or III, with lesser inversion in Lead II.

The diagnosis has to be made in the first instance from true angina pectoris. In cardiac infarction, the onset is sometimes when the patient is at rest; in angina it occurs during exertion. In infarction the patient is restive, and may even walk about; in angina the patient is immobile. Dyspnœa may be present and vomiting is frequent in infarction; both are absent or rare in angina. In angina, again, the pulse is either unchanged or harder, the blood-pressure is raised, the heart-sounds are normal, and congestive failure is absent; in infarction, however, the pulse is rapid soft and irregular. There is a fall in blood-pressure, there may be a pericardial rub, and the patient may ultimately suffer from congestive cardiac failure. Fever is usually absent in angina.

The diagnosis as between cardiac infarction and the acute abdomen when the pain is low can never be easy; cases have been mistaken for perforated duodenal ulcer, acute cholecystitis, and colic. Embolic obstruction of a mesenteric artery from the detachment of a portion of the cardiac thrombosis inevitably leads to obstruction. In cardiac infarction there may have been previous slight pain on exertion related to the sternum or arms, and there may be signs of cardiac failure such as dyspnœa and cyanosis. In abdominal conditions there may have been symptoms pointing to the stomach or gall-bladder. The possibility, however, of the coexistence of infarction and an acute abdominal condition, as in one case cited, cannot be altogether ruled out.

A discussion on cardiac infarction took place at the Royal Society of Medicine on Jan. 24, 1928.[2] Parkinson said that the basis of the condition lay in the presence of arteriosclerosis, and the typical changes in the aorta could be identified in the living by the bend or knuckle of the descending part of the arch of the aorta being more prominent and denser in the X-ray; also other parts of the aorta are more readily seen. Bedford referred to the fact that cardiac infarction is not immediately fatal unless the patient disregards the symptoms, and it was therefore necessary to insist on complete and prolonged rest. With regard to the differentiation of cardiac infarction and abdominal conditions, dyspnœa and tachycardia were more likely to occur in cardiac infarction. He had never seen board-like rigidity of the abdomen in cardiac infarction. The physical examination of the heart might reveal no abnormality. Coombs referred to a weakening in the cardiac sounds; in two-thirds of his cases the sounds were inaudible. This speaker emphasized the fall in blood-pressure, which affected mainly the systolic pressure. Other features noted were that 80 per cent of his patients fell into the group of senile arteriosclerosis; the relative infrequency of embolism; the frequency of thrombotic processes in other parts, especially cerebral or limb vessels; and occasionally its family incidence. Several cases had been observed in close relation to an infective disease.

J. A. Ryle[3] has made a study of the evidence of cardiac infarction in John Hunter's case from the description by Sir Everard Home. Ryle concludes that his first seizure in 1773 was in all probability due to a coronary thrombosis. His symptoms, which began at 10 a.m., were pain in the region of the pylorus, the sensation peculiar to that part unrelieved by any change of position, there was great pallor, no pulse at the wrist, and apnœa. At the post-mortem there were two scars 1½ in. in diameter in the inferior wall of the left auricle and left ventricle.

H. W. Jones and C. A. Birch[4] record a case of coronary occlusion following parturition in a multipara aged 26, the subject of mitral stenosis and slight aortic regurgitation. In the thirty-fourth week she was delivered of a living male child 4 lb. 8 oz. in weight. The puerperium was normal till the eighth day, when the patient was suddenly seized with pain behind the sternum, continuous and localized. The pulse was rapid, pericardial friction appeared, and later leucocytosis. The diagnosis was confirmed by the change that had taken place in the electrocardiograph. Of two cases published by T. W. Davidson,[5] one was that of a man, age 55, who apparently survived 24½ years from the initial infarction.

G. Hadfield,[6] in dealing with *the pathology of coronary occlusion*, refers to the invariably fatal effect of Cohnheim's experiments of clamping the coronary arteries in curarized dogs. This, coupled with the inability of injecting one branch from another, accounted for these arteries being looked upon as end-arteries. Spalteholz in 1907 proved that there was anastomosis, and a more careful experimental technique showed that only a proportion of animals died—8·7 per cent for the descending branch of the left coronary artery, 80 per cent for the circumflex branch, and 20 per cent for the right coronary artery. An improved injection technique by Gross showed that the capillary and pre-capillary anastomosis is specially rich, which explains the recovery which takes place after coronary thrombosis. The blood-pressure at the site of the ligature has a great effect in determining the extent of the necrosis; the lower the pressure, the greater the area of necrosis. The complexity of the anastomosis increases with age, and the fatty covering which increases with age acts in the same way of providing an increase in blood communication between neighbouring parts of the heart.

E. Moschcowitz[7] discusses *the effect of tobacco on the heart*, and reports four cases. The first, a male age 61, had violent attacks of precordial pain lasting about a minute, coming on mostly when at rest. They were relieved only partially by morphine; sometimes they were rhythmical, every 6 to 7 minutes. They ceased two months after giving up cigarette-smoking following a terrible and prolonged attack. The blood-pressure was not raised, there was no evidence of cardiac abnormality, and the patient had no recurrence during the period of observation. The author notes in this and his other cases no change in the colour of the patient. In another case, a man age 21, there was a history of syphilis, but the attacks of cardiac pain could be made to cease or come on again by abstaining from or indulging in tobacco. Another case was that of a lawyer, age 52, who had smoked 12 to 18 strong Havana cigars per diem since the age of 25; here the pains entirely ceased in two months after giving up smoking; again there was no cardiac abnormality, either clinical or electrical. The fourth case was that of a woman, age 35, a smoker of Turkish cigarettes. The pains entirely ceased on giving up smoking. The author remarks that the pains in tobacco angina are more intense and longer, more likely to arise at rest or even during sleep. The fact that has been noticed before, e.g., by Rolleston, that patients who have had this complaint may suffer a recurrence from the slightest re-indulgence, was confirmed. The author concludes that though some cases of this type are pure 'tobacco hearts', in other cases tobacco is only one factor, the other being syphilis or atheroma.

K. F. Wenckebach[8] calls attention to the fact that in angina pectoris the pain comes on more readily from a sudden stimulus of one of the primary causes of the attack, namely, exertion, digestion, anger, and exposure to cold. He states also that exertion, which under certain conditions might precipitate an attack, under other conditions, or if the exertion is undertaken more easily, may be indulged in without producing this result. He makes an interesting comparison between the distress and pain on exertion in certain forms of competitive athletics and the anginal paroxysm; both are accompanied by a great rise in blood-pressure and a distention of the aortic walls. He compares the relief afforded to the athlete when he gets second wind to the relief of the anginal paroxysm on lessening the blood-pressure by the administration of nitrites. [These observations recall an experience of the present reviewer, who, in an untrained condition and after a full meal, attempted on a cycle to keep up the pace of his companion who was in much better condition. The exertion called forth a pain in the region of the left clavicle and left sternomastoid not sufficient to stop exertion. After a few minutes dilatation of the skin vessels occurred, in waves at first, later permanently, as the bodily heat increased, and the pain ceased, but intermittently in waves alternating with the waves of dilatation of the skin.—A. G. G.]

H. Kutschera-Aichbergen,[9] in three cases of angina pectoris, one of which had syphilitic aortitis, found that all had a widening of the ascending branch of the left coronary artery as compared with the normal, and a great stretching and some atrophy of the muscular layer.

L. B. Eckerson, G. H. Roberts, and T. Howard[10] describe four cases in which, after attacks diagnosed clinically as coronary thrombosis with recovery, a considerable degree of pain persisted on exertion. One of these also complained of dyspnœa accompanying the pain. [The reviewer observed a similar case with a fatal issue five years after the primary infarction; the heart had an aneurysmal dilatation of the anterior and lower aspect of the left ventricle involving the septum.—A. G. G.]

C. F. T. East, C. W. C. Bain, and F. L. Cary[11] draw attention to a form of *cardiac infarction in which there is no pain*. They describe 4 cases, 3 verified post mortem. The type has been described before, and is distinctly rarer than the ordinary type with pain. One case had an attack of dyspnœa and giddiness followed by dyspnœa on exertion which became more troublesome and required bed treatment. He died suddenly. Another case had a sudden faint with twitching of the face after mounting a flight of stairs. Later there was a restriction of capacity for exertion and then chronic cardiac failure with a sudden ending. These cases belong to the class of sudden left-sided cardiac failure, and their immediate symptoms are mainly due to a sudden fall in blood-pressure.

Carey Coombs in this country has drawn attention to the *angina that sometimes accompanies severe anæmia.* J. B. Herrick[12] has seen 7 such cases. They all showed evidence of vascular and myocardial degeneration, with dyspnœa, sometimes nocturnal, extrasystoles, and substernal pain on walking. One of the cases after a year of anginal symptoms showed a typical pernicious anæmia. The anginal symptoms diminished as the anæmia became worse. Another case had a cachectic anæmia from a carcinoma of the kidney.

H. Feil and M. L. Siegel[13] have observed the *electrocardiographic effects of paroxysms of angina* in four patients. All were of the classical type, brought on by effort or distension of the stomach. All had had the disorder for several years, all but one had raised blood-pressure, and in no case had there been symptoms of cardiac infarction. In three patients there was inversion of the S T portion of the curve in Leads I and II during the attack, and a normal curve appeared afterwards. In one of these patients neither vagal stimulation, drinking of cold water, nor respiration showed any change similar to that seen during a paroxysm. One patient showed no electrocardiographic change.

TREATMENT.—J. C. White and P. D. White[14] have studied the production of **Paravertebral Nerve-block** for severe angina pectoris in 5 cases: 2 patients showed complete relief from the left-sided anginal attacks but continued to have mild attacks on the right side; in 2 patients the severe attacks became mild and less frequent; one patient had relief for a few days only. They describe the technique of Swetlow. The Whites injected the first four intercostal nerves on the left side, entering the skin 4 cm. to the left of the spinous processes. They remark on the necessity for extreme accuracy in technique. They believe that the injection of alcohol so near the pleural cavity and the spinal cord is not without dangers, and they have used it only in very severe cases of angina with full knowledge of the patient that the procedure had its risks. A troublesome symptom as the costal anæsthesia recedes is hyperæsthesia.

R. Singer[15] records a case of angina pectoris in which the pain was confined to the chest in a robust male of 52, in which the sympathetic roots of the 8th cervical, 1st, 2nd, and 3rd dorsal nerves were severed between the ganglia and their corresponding spinal nerves. The operation was done under local anæsthesia and was successful in causing the pain to disappear from the left side; attacks, however, persisted, though of much less severity, the pain having shifted to the right side, but they were so slight as to interfere but little with the ordinary life of the patient.

REFERENCES.—[1]*Lancet*, 1928, i, 4; [2]*Proc. Roy. Soc. Med.* (Med. Sect.) 1928, 723; [3]*Lancet*, 1928, i, 332; [4]*Ibid.* 27; [5]*Brit. Med. Jour.* 1928, i, 212; [6]*Bristol Med.-Chir. Jour.* 1927, 257; [7]*Jour. Amer. Med. Assoc.* 1928, xc, 733; [8]*Wien. klin. Woch.* 1928, Jan. 5, 1; [9]*Ibid.* 6; [10]*Jour. Amer. Med. Assoc.* 1928, i, 1780; [11]*Lancet*, 1928, ii, 60; [12]*Amer. Heart Jour.* (abstr. *Jour. Amer. Med. Assoc.* 1927, ii, 151); [13]*Amer. Jour. Med. Sci.* 1928, Feb., 255; [14]*Jour. Amer. Med. Assoc.* 1928, i, 1099; [15]*Wien. klin. Woch.* 1927, Aug. 4, 989.

ANKYLOSTOMIASIS. *Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.*

INCIDENCE AND EPIDEMIOLOGY.—A. C. Chandler[1] has published a map and the conclusions of his extensive investigation of the incidence of hookworms in India, which brings out the important fact that a high index of infection is only found in very limited parts of Burma, Assam, and Malabar, and moderate degrees in Burma, Assam, the adjacent areas of Bihar, and the United Provinces and the Southern Bombay Coast, which form only a small portion of India as a whole. In the rest of India "the amount of hookworm present is so small that it is of no practical consequence and can safely be ignored as an important health problem." In the whole of Central and North-east India, comprising about half the whole country, the infection is extremely light and below the harmful point, owing to the prolonged dry season limiting infections to a short period of the year. A map of ascaris infections shows a very similar distribution. A. K. Mukherji[2] records the results of routine examinations of all patients in the Calcutta School of Tropical Medicine Hospital, totalling 1524, who showed hookworm ova in 27·6 per cent, ascaris in 10·7 per cent, and trichuris ova in 13·4 per cent, but the degrees of infection are not dealt with. P. A. Maplestone,[3] in the same Research Institute, has investigated the rate of loss of hookworm ova in fæces preserved in tightly fitting tins for transmission to a distance for examination, and he found that there is a steady decrease of the numbers during the first six days amounting to about 50 per cent by the end of that time, but little after six days. G. M. Hendon[4,5] records further observations on the conditions affecting hookworm ova and larvæ, and has found, contrary to the general view, that daylight rapidly injures and kills the larvæ, but they can survive drying in earth for several days. In latrine pans, urine is destructive of the ova and larvæ through the ammonia formed, but the ova may survive a week or more in privy pans in the Queensland climate.

PROPHYLAXIS AND TREATMENT.—The effect of hookworm infection on physical efficiency has been investigated by A. K. Mukherji[6] by means of Schneider's cardiovascular test on prisoners with light hookworm infections, and he found no demonstrable loss of physical efficiency, and no appreciable rise of it after expulsion of the worms except in a few cases. D. de Rivas[7] describes yet another method of rapidly concentrating and detecting ova and cysts of intestinal parasites; it also allows of testing for occult blood and the amount of bile present. To a measured quantity of stool, such as 1 or 2 grm., about 5 c.c. of a 5 per cent solution of acetic acid is added in a test-tube, which is closed with a rubber stopper or a thin rubber disk and well shaken; it is then allowed to settle for a minute, and the coarse sediment is removed by a sieve or by pipetting off the supernatant fluid containing the ova. Add an equal volume of ether to about 5 c.c. of the filtrate in a centrifuge tube, shake, and centrifuge for a few minutes, when a detritus plug containing the ova and cysts forms between the ether above and the acetic acid below; this is pipetted off and examined microscopically, the whole procedure taking but a few minutes. Quantitative estimations can be made, and the ether layer tested for bile and blood. C. A. Lane[8] writes further on the need of controls in hook-worm inquiries.

R. T. Ritchie[9] reports on the hookworm campaign in Samoa, where over 40,000 treatments have been given since 1923 with no known fatal results, two minims for each year of age of three parts of **Carbon Tetrachloride** and one of **Oil of Chenopodium** having been used since 1924. P. D. Lamson, A. S. Minot, and B. H. Robbins[10] write on the prevention and treatment of *carbon tetrachloride intoxication*, which they find to be due to irritation or mechanical obstruction by round-worms, alcoholism, the presence of undigested food in the bowel, and calcium deficiency, which favours intestinal hæmorrhage. They recommend a preliminary purge when round-worms are present, and avoiding alcohol or food shortly before the drug, and they advise calcium therapy in cases of intoxication after carbon tetrachloride. S. M. Lambert[11] reports further on mass treatment with carbon tetrachloride in Fiji, where 3,000,000 treatments were given in 1926, against about one-sixth of that number before the introduction of this valuable drug, which is best given in combination with oil of chenopodium. Previously rapid reinfection occurred, but now mass treatments allow of the removal of the dangerous female worms *en masse* from a district, the prevention of reinfection, and control of the disease within economic limits.

D. de Rivas[12] writes further on his 'intra-intestinal thermal method' of treatment based on 500 cases, from which he concludes that **Hot Salt Solution** at a temperature of 45° to 47° C. is safe and efficient in rapidly and completely removing protozoan and metazoan parasites from the small and large intestine of man, but the temperature must be very carefully regulated. The solution may be given direct into the duodenum through a duodenal tube, or by enemas into the colon. The use of this solution by the duodenum or the rectum in dogs produced no appreciable symptoms and no pathological changes in the mucous membrane. The patient should take a light supper and one or two ounces of magnesium sulphate the night before, and have an enema in the morning two or three hours before the treatment; the hot solution must be run in slowly, and a thermometer in the rectum should not rise above 45° to 47° C. during the treatment. The desired temperature in the bowel should be maintained for five to fifteen minutes, 500 to 1000 c.c. being injected at a time, and any excess siphoned off. In addition to worm infections, he advocates this treatment for amœbic disease of the bowel and flagellate infections.

References – [1]*Ind. Jour. Med. Research*, 1928, Jan., 695; [2]*Ind. Med. Gaz.* 1927, Dec., 695; [3]*Ibid.* 1928, June, 324; [4]*Med. Jour. of Australia*, 1927, Oct. 29, 611; [5]*Ibid.* Nov. 5, 640; [6]*Ind. Med. Gaz.* 1927, Oct., 562; [7]*Amer. Jour. Trop. Med.* 1928, Jan., 63; [8]*Jour. of State Med.* 1927, Aug., 458; [9]*Med. Jour. of Australia*, 1927, Nov., 397; [10]*Jour. Amer. Med. Assoc.* 1928, Feb. 4, 345; [11]*Jour. Trop. Med. and Hyg.* 1928, May 15, 113; [12]*Amer. Jour. Trop. Med.* 1927, Nov., 389.

ANUS, CONGENITAL ABSENCE OF.

J. P. Lockhart-Mummery, F.R.C.S.

J. P. Lockhart-Mummery[1] describes two cases of this condition, one in a girl, age 14 years, the other in a girl of 9. In both instances the rectum opened into the middle of the posterior vaginal wall (*Fig.* 4). Both cases were operated on by a similar method. An incision was made through the posterior vaginal wall commencing at the rectal orifice and carried backwards in the midline of the perineum. A transverse incision was also made behind the vagina to give greater access. The rectum was then completely separated from the posterior vaginal wall and well freed, the peritoneal reflexion being exposed but not opened. The rectum was then transplanted back to its proper position and the mucous membrane sutured to the skin. The levator ani muscles were stitched together in front of the rectum and the perineum, and the posterior vaginal wall was restored by sutures. Healing in both cases occurred by first intention, and the patients were normal to all appearances except that there was no external sphincter. The amount of control, however, was quite good, and a great deal better than had been the case when the rectum was in its old position in the posterior vaginal wall. Both children were able to attend school.

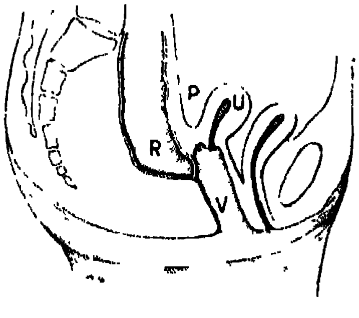


Fig. 4.—A case of congenital absence of the anus. P, Peritoneal cavity; R, Rectum; U, Uterus; V, Vagina. (*Re-drawn from the 'Proceedings of the Royal Society of Medicine.'*)

Reference.—[1]*Proc. Roy. Soc. Med.* 1927, Nov., 77.

APPENDICITIS.

A. Rendle Short, M.D., F.R.C.S.

Anatomy.—C. P. G. Wakeley and R. L. Gladstone[1] have investigated the position of the normal and pathological appendix, which is not accurately described in the text-books. They find after many years' study that in 5000 cases the position is as follows :—

Positions of Appendix	No. of Cases	Per cent
1. Anterior or pre-ileal	47	0·94
2. 'Splenic' or post-ileal	25	0·50
3. 'Pelvic', on psoas muscle, near or hanging over the brim of the pelvis	1606	32·12
4. Subcæcal, beneath the 'caput cæci' ..	101	2·02
5. Post cæcal and retrocolic	3219	64·38
6. Ectopic	2	0·04

It will be observed that the 'splenic' or post-ileal position, said to be the commonest, is really quite rare. When such an appendix becomes inflamed it is serious, as portal pyæmia may follow.

Acute Appendicitis.

J. O. Bower and J. H. Clark[2] refer to the *danger of giving aperients* in cases of possible early appendicitis. During the year 1926, at the Samaritan Hospital, Philadelphia, 92·3 per cent of the patients who died of a spreading peritonitis had been given an aperient : 77·4 per cent of those with local peritonitis, and only 24·3 per cent of those with non-perforated appendix.

J. Brennemann[3] examines the evidence for some *association between epidemics of affections of the upper respiratory tract and acute appendicitis.* He quotes a large number of authors who have advanced lists of cases in which the appendix has become inflamed a fortnight or so after a sore throat or cold. The connection, however, cannot be regarded as proved, and of course abdominal pain after a febrile attack is common, and generally *not* due to the appendix.

The Time to Operate.—Several authors have discussed this question. All are agreed on the value of the early operation, but there is difference of opinion as to the best course when the appendix has burst and the patient is toxic.

H. H. Rayner,[4] presenting a study of the cases at Manchester Royal Infirmary over many years, and 245 under his own care, deferred opening in 52 with local peritonitis : 28 of these settled down, and had the appendix removed later; 12 formed a local abscess which was drained, and had to be operated on whilst still acutely ill, 3 of them dying. The total mortality was 4 per cent in the 245 cases. The types in which he believes it safer to wait are : (1) When there is a large, firm mass, not tender, with ill-defined outlines, in the right iliac fossa, with a history of four to eight days, and often little or no treatment. These usually clear up completely. (2) Third- or fourth-day cases, with well-marked muscular rigidity but not acutely tender, with some rise of pulse and temperature, and particularly if the subject is not a good one for surgery, if the attack is no worse than its predecessors, or if the appendix seems, from the site of maximum tenderness, to be retrocolic. He prefers the paramedian incision in ordinary. In the after-treatment he insists on the value of withholding all fluids by the mouth for forty-eight hours, to allow time for the ileum to recover its conductivity.

J. B. Deaver[5] approaches a retrocolic abscess by stripping the peritoneum extraperitoneally so as to reach the abscess from its postero-lateral aspect; by doing so the large and small intestines are interfered with as little as possible.

Schaer[6] gives a summary of a large number of German and Swiss statistics on the subject of appendicitis. The mortality in 1765 cases of acute appendicitis is given as 4·1 per cent. The methods of treatment are much the same as here except that more surgeons employ lavage.

M. Riedel[7] says that the difference of opinion as to the question of operating in the intermediate stage is of old standing and still undecided in Germany. He quotes figures by Reschke-Greifswald much in favour of expectant treatment at this stage, as follows:—

TREATMENT IN THE INTERMEDIATE STAGE OF APPENDICITIS (GREIFSWALD).

Method of Treatment	No. of Cases	Died	Mortality per cent
Radical operation	200	7	3·5
Of these, there was circumscribed peritonitis in 62 cases, with 7 (11 per cent) deaths			
Conservative treatment	231	1	0·4
Of these, there was circumscribed peritonitis in 126 cases, with 1 (0·8 per cent) death			

Riedel, however, is in favour of operating in the intermediate stage, because, if conservative treatment fails, the eventual operation has to be performed under very unfavourable circumstances. He quotes a total mortality in 1016 cases of 1·77 per cent.

CASES OPERATED ON FOR APPENDICITIS (1925–6, RIEDEL).

Character of Case	No. of Cases	Deaths	Mortality per cent
Acute uncomplicated ..	399	2	0·5
Peritonitis	100*	11	11·0
Abscess	31	4	12·9
Subacute	127	1	0·78
Chronic and interval ..	356	-	-
Total	1013	18	1·77

*58 were cases of diffuse suppurative peritonitis, with 7 (12 per cent) deaths.

He mentions that Schönbaur at von Eiselsberg's clinic at Vienna has reduced the mortality from 28 per cent to 9 per cent by pouring in pepsin-HCl in cases of appendicitis-peritonitis.

G. Robertson[8] advocates *getting patients up soon* after abdominal operations. He says that cases of appendicitis can usually get up safely on the second day and go home on the third.

DIAGNOSIS.—J. B. Carnett[9] maintains that many of the cases designated 'appendicitis' are nothing of the sort, whether acute or chronic, but that the symptoms are due to intercostal neuralgia or a vague condition of the abdominal wall which he calls pseudo-appendicitis. The main physical sign by which one may differentiate this from true appendicitis is by observing whether the tenderness over the right iliac fossa persists when the patient contracts the abdominal muscles, as by half-rising from the bed. If the tenderness is visceral, it will be abolished because the tense muscles protect the appendix; if it persists, the muscles themselves are at fault, and removal of the appendix is useless and unnecessary, whether the temperature is up or not. In these cases of pseudo-appendicitis, vomiting is unusual and muscular rigidity quite rare. Carnett's communications are long, and he rather overstates his case, but the sign is worthy of attention, and may prove of value. We all admit having removed some appendices which did not show much the matter with them.

X-ray Diagnosis.—A. Czepa[10] advocates the addition of a few drachms of magnesium sulphate to the barium meal to render the appendix more visible. He screens at 8, 24, and 48 hours. If it does not fill with barium, he repeats the test; if still it does not fill, it is certainly blocked. He does not attach much importance to gaps in the filling. If the appendix takes over 4 days (8 days in a costive person) to empty, it is pathological. An appendix which fills and empties well, is not tender, and is movable, is normal. A fixed appendix, a very stumpy one, or a tender appendix, is probably abnormal.

M. Ritvo[11] gives pictures showing how an appendical abscess may be demonstrated by X rays, one of which is reproduced in *Plate VII.* It is sometimes difficult to distinguish clinically from a mass in the cæcum.

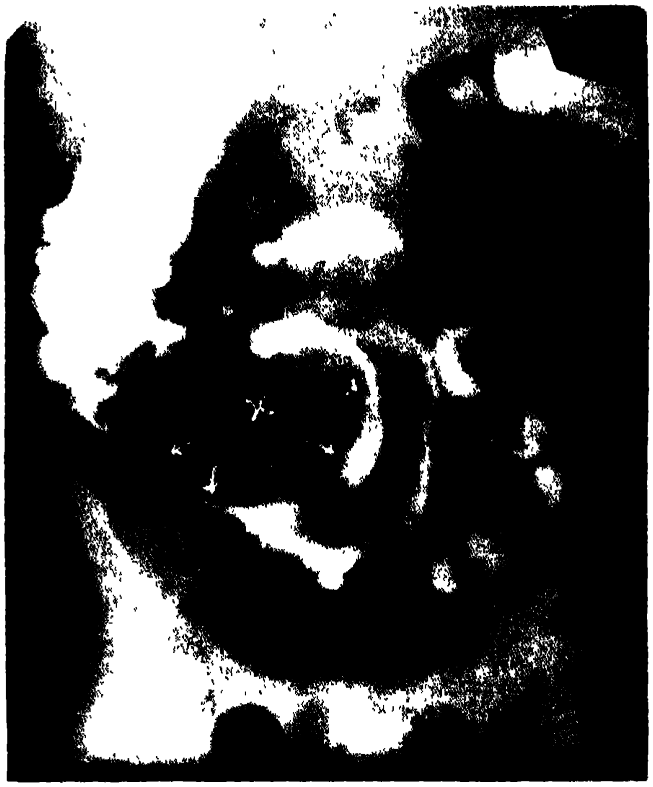
CHRONIC APPENDICITIS.

A considerable literature has appeared in the past year on the subject of chronic appendicitis. It was debated by W. Trotter,[12] J. W. Dowden, V. Bonney, and A. J. Walton at the Edinburgh meeting of the British Medical Association, and again at the Royal Society of Medicine in February, with special reference to its occurrence in children. Trotter appeared as an exponent of what may be described as the orthodox position, that there is such a condition as chronic appendicitis apart from the remainders of acute attacks. It is characterized either by local pain and tenderness (in children especially by a sudden brief needle-like pain), or by remote symptoms such as cholecystitis, stomach derangements, or actual gastric or duodenal ulceration, due to the appendix. A definite difference in the tension of the two recti is probably the best physical sign. Dowden agreed, but mentioned the numerous conditions which may mimic it, such as tuberculous glands, cyclic vomiting, tender or neuralgic conditions of the abdominal wall, incipient hernia, and visceroptosis, as well as lesions of the other abdominal organs. Victor Bonney added to these the gynæcological conditions of chronic salpingitis and endometrioma (blood cysts of the ovary). The pain in the latter case usually comes on at some definite time in relation to the patient's menstrual cycle, and the swelling can be felt per vaginam. Walton[13] doubted the existence of chronic appendicitis, apart from remainders left over from an acute attack, either as a cause of upper abdomen symptoms, or as causing pain in the right iliac fossa. In his experience the failure to perform appendicectomy when operating for upper abdomen conditions does not lead to any recurrence of symptoms. Speaking at the Royal Society of Medicine, he declared that his own cases failed to reveal a single one of appendicitis chronic from the beginning, unless we consider as such patients with thread-worms in the lumen. However, he believes that children in whom a diagnosis of chronic appendicitis is made ought to be operated on, as the appendix may really be potentially acute, or there may be inflamed mesenteric glands. Robert Hutchison,[14] speaking at the same meeting, agreed that chronic appendicitis is rare under the age of fourteen, but it does occur. Appendix dyspepsia is not

PLATE VII

APPENDICAL ABSCESS

(M. Kirvo)



Skiagram of appendical abscess taken six hours after barium meal. X indicates site of abscess; arrows point to displaced and fixed terminal ileum.

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'Boston Medical and Surgical Journal.'

seen in children. The usual picture is lower abdominal pain coming on in attacks, with or without vomiting or fever; during these attacks there is tenderness over the appendix. Even if exploration does not reveal anything wrong with the appendix in such cases, the surgeon seldom draws blank; a kink, or mesenteric glands, or a band, will as a rule reward the search.

M. Letulle,[15] and later G. Laroche,[16] report several examples of chronic appendicitis showing after removal an abscess in the wall or pus in the lumen.

COMPLICATIONS OF APPENDICITIS.

W. A. Barnes and L. V. Pearson[17] describe an encouraging case of acute appendicitis followed by *abscess of the liver*, after a very serious illness. The onset was quiet, but later the man developed rigors, and the liver was enlarged. At operation a hepatic abscess was drained and the appendix removed. He recovered. [This is not so very rare. I have had a similar successful case.—A. R. S.]

Voncken[18] writes on the occurrence of *acute intestinal obstruction* after appendicitis. It may be *primary*, seen concomitantly with the symptoms of the appendicitis, and due to peritonitis. He advises to remove the appendix, mop out the abdomen, pack off with a gauze plug (Mikulicz treatment), and stand by to open the cæcum if the obstruction symptoms continue. Or it may be *early*, that is, after, say, two or three days of improvement since the appendicectomy. The obstruction in this instance is due to adhesions, kinking, or intestinal paralysis. It is urgently necessary to open the cæcum or the small intestine, to establish drainage; a local anæsthetic will suffice. [We prefer to open the small intestine, and to give anti-gas-gangrene serum. —A. R. S.] In the *late* cases, supervening more than a week after the operation, one will usually find a band, or the intestines may be snared in the pelvis by massive adhesions. The treatment is to make an enterostomy above the obstacle.

A case is recorded by J. Fiolle and L. Hayem[19] of intestinal obstruction occurring four weeks after removal of the appendix, due to an adhesion to the stump, which had not been buried.

REFERENCES.—[1] *Lancet*, 1928, i, 178; [2] *Jour. Amer. Med. Assoc.* 1927, Sept. 10, 844; [3] *Ibid.* 1927, Dec. 24, 2183; [4] *Brit. Med. Jour.* 1928, i, 706; [5] *Jour Amer. Med. Assoc.* 1928, May 26, 1679; [6] *Beit. f. klin. Chir.* 1926, cxxxvii, 310; [7] *Munch. med. Woch.* 1927, Aug. 26, 1456; [8] *Practitioner*, 1927, Sept., 162; [9] *Amer. Jour. Med. Sci.*, 1927, Nov. Dec., 579–833; [10] *Fortschr. a. d. Geb. der Rontgenstrahlen*, Bd. xxxvi, 1; [11] *Boston Med. and Surg. Jour.* 1927, Aug. 25, 307; [12] *Brit. Med. Jour.* 1927, ii, 1063, 1066, 1068; [13] *Lancet*, 1928, i, 595; [14] *Ibid.*, 444; [15] *Presse méd.* 1927, Dec. 14, 521; [16] *Ibid.* 1928, Feb. 18, 213; [17] *Brit. Med. Jour.* 1928, i, 390; [18] *Arch. méd. Belges*, 1928, Jan., 1; [19] *Bull. et Mém. Soc. nat. de Chir.* 1928, June, 813.

ARRHYTHMIA. (*See also* HEART, ACTION OF DRUGS UPON.)

A. G. Gibson, M.D., F.R.C.P.

J. Parkinson and D. E. Bedford[1] contribute an important paper on ***auricular flutter***, dealing with 52 patients. Forty cases had an established flutter, i.e., it had been present more than fourteen days. Twelve had paroxysmal flutter. Bouts of palpitation are often complained of by patients with established flutter and are not to be compared with the paroxysmal variety. Paroxysmal flutter often alternates with paroxysmal fibrillation. Once a paroxysm has occurred its recurrence is almost certain. Paroxysmal flutter is much less common than paroxysmal fibrillation.

As to the symptoms, heart failure of the congestive type was present in 24 cases. Generally the symptoms are those of a degree of heart insufficiency with tachycardia. Breathlessness, palpitation, giddiness, weakness with fainting, and disinclination for effort were common. Thoracic pain occurred in 12 not including those with angina. Pain may arise with the onset of a paroxysm or follow exertion. Numbness of the left arm was noticed in three cases. The pain of flutter may be mistaken for angina or for coronary thrombosis. But it must be remembered that anginal patients may get flutter, and that flutter patients may get typical anginal attacks. Syncope has not been found to be common; it occurred in 5 cases. The patient may become deeply comatose. These attacks may follow exertion. The pulse was regular in 30 cases, irregular in 22. In 36 the initial pulse-rate was between 120 and 170, in ten between 90 and 120. In four cases the pulse was slow, and in two, 254 and 275 respectively. The systolic blood-pressure is slightly raised. Nine cases showed embolism. Vagal pressure was effective in slowing the ventricular rate only in digitalized patients; it is not without danger.

The optimum age is between 40 and 50, and it is much more common in males than females (10 to 1). Of the cases recorded, five were in otherwise healthy hearts, two occurred in acute rheumatism, three in other infections, one in chronic rheumatic heart disease, two in hyperthyroidism, one in hyperpiesis, three after coronary thrombosis. A pulse-rate between 120 and 160 is more likely to be flutter, whereas above 160 it is more likely to be paroxysmal tachycardia. Prognosis is not usually favourable. Heart failure may be precipitated; in other cases incapacity for work. Flutter even in normal hearts produces serious incapacity. The onset of continuous flutter is more serious than continuous fibrillation, and a change from flutter to fibrillation is always beneficial. Prognosis depends upon the underlying cardiovascular lesion, the tolerance to the abnormal rhythm, and the response to treatment. A healthy heart requires relief of symptoms and restoration of capacity of work. Flutter with cardiac impairment may induce failure and shorten life.

As to treatment, **Quinidine** will restore normal rhythm in a proportion of cases, and fibrillation is avoided by this method. Quinidine if successful should be continued in small doses. If **Digitalis** has changed flutter to fibrillation, quinidine may then change the rhythm to normal. Digitalis will restore normal rhythm with or without fibrillation in one in three cases without the use of quinidine. The restoration to normal rhythm is always associated with the risk of embolism.

H. Moore[2] reports five cases of auricular flutter in three men and two women. One case was so seriously ill that she died before treatment could be given. In all the others normal rhythm was produced by digitalis medication. The first case relapsed after normal rhythm had been established. In the second, third, and fifth cases normal rhythm was established after a preliminary period of auricular fibrillation

C. E. K. Herapath[3] reports five cases of auricular flutter, in four of which it was possible to effect a return to a normal rhythm either by digitalis or quinidine. In the fifth case, one of mitral stenosis, it was judged better to change the rhythm by digitalis to auricular fibrillation and to keep it so, which enabled him to do light work.

On the subject of *auricular fibrillation*, J. C. Bramwell[4] remarks that the great majority of cases can be recognized without instrumental means by noting whether the irregularity persists with exercise, as it does in fibrillation.

A. A. F. Peel[5] has examined a series of cases showing *extrasystoles*. He finds them in patients with organic cardiac disease or with none. Two-fifths of those with organic lesions have a non-infective origin such as hyperpiesis. Males are in preponderance. Age increases the liability. In women some further factor, possibly the menopause, causes an increase in the fifth decade. Chronic aortic lesions and mitral regurgitation increase the tendency to ventricular extrasystoles, while mitral obstruction increases that for auricular extrasystoles. In acute infective processes they tend to arise in multiple foci. Angina pectoris with high blood-pressure causes auricular extrasystoles. Pulmonary complications tend to give rise to right ventricular extrasystoles.

REFERENCES.—[1]*Quart. Jour. Med.* 1927, Oct., 21; [2]*Lancet*, 1928, i, 795; [3]*Brit. Med. Jour.* 1928, i, 213; [4]*Lancet*, 1928, i, 657; [5]*Glasgow Med. Jour.* 1928, May, 376.

ARSENICAL POISONING. (*See also* POISONING—STOVARSOL.)

Joseph Priestley, B.A., M.D., D.P.H.

At last a common-sense official report has been issued that should go a long way to give all medical practitioners 'furiously to think', and to settle what have appeared to be medico-legal inconsistencies and methods of reasoning. Speaking generally, the presence of arsenic in the body, found on post-mortem, does not necessarily mean 'death from arsenic poisoning'. In other words, it is not uncommon for persons to die from natural causes, even though post-mortem examination shows also the presence of arsenic in their bodies, and that, too, even in comparatively large amounts. This fact requires emphasizing. The Ministry of Health reports, during 1927-28, traces of arsenic found in samples of beer, fruit, baking powder and self-raising flour, toffee, etc. Similar reports have been issued yearly in the past and are well known, but it has been left for Sir William Willcox to summarize and crystallize present-day knowledge on 'arsenic', and this he has done in a manner that must have far-reaching consequences in the future, not only in medical cases generally, but especially so in medico-legal cases. The great fact to remember is that arsenic may accumulate in the organs of the body, and seems to be stored there for long periods of time, even though the arsenic may have been administered as a medicine (under prescription) in small doses.

ARTHRITIS AND RHEUMATISM, CHRONIC.

Ivor J. Davies, M.D.

M. B. Ray,[1] in an article on the *pathogenesis* of rheumatism, concludes that considerations of the etiology of rheumatic diseases must include the conception of a 'rheumatic substrate' operative throughout the body, and that this 'substrate' is largely explicable by unbalanced states of the autonomic nervous system. Considerations of septic foci, however important they may be as contributory causes, are, after all, only one link in the tortuous chain of causality.

N. Mutch,[2] in the course of an investigation of the *bacteriology* of chronic arthritis, obtained in one case a pure culture of *B. fallax* (Morcom). This organism is an intestinal anaerobe, and has been isolated occasionally from gangrenous wounds and from the blood in puerperal septicæmia. There is no previous record in the literature of chronic infection by this bacillus. A vaccine was prepared and used subcutaneously in the treatment of forty-seven cases of chronic arthritis, and good results were obtained in a majority. Mutch suggests the addition of this organism to the autogenous vaccine in the treatment of chronic arthritis, especially when the joints have been damaged previously by injury or coccal infection, or are the seat of disease which has been non-pyrexial and insidious from the onset.

F. Green,[3] in a study of the serology in arthritis, used three polyvalent antigens—*Streptococcus viridans*, *Str. hæmolyticus*, and a gonococcus antigen. R. Burbank and L. C. Hadjopoulos,[4] in 1925, having adopted a modified complement-fixation test in more than a thousand cases of arthritis, and having employed antigens prepared mostly from the *Str. hæmolyticus* and the *Str. viridans*, claim to have succeeded in classifying the infective arthritides into three clinical and serological entities: (1) Acute or subacute peri-arthritis caused solely by the *Str. hæmolyticus*; (2) Exudative peri-arthritis (arthritis deformans), caused also by a *Str. hæmolyticus* but of a different strain; (3) Chronic productive osteo-arthritis (hypertrophic arthritis), caused exclusively by the *Str. viridans*. Green's conclusions were as follows: With the limited number of sera examined and the three antigens used, the predominant invaders in arthritis deformans seem to be the *Str. viridans* and the gonococcus, either associated with each other or by themselves. There is no marked discrepancy between the results obtained by following the Burbank-Hadjopoulos method and that of the complement-fixation usually employed, together with the removal of the natural anti-sheep amboceptor.

L. T. Swaim and L. M. Spear[5] have studied the *basal metabolism* in chronic arthritis. The classification of infectious, atrophic, and hypertrophic types of arthritis was adopted. The calculations were estimated by the Du Bois method, and the ± 10 per cent of the Du Bois standards was adopted as their standard of normal. The following summary is presented: (1) 39 per cent of 200 cases of chronic arthritis had an abnormal metabolic rate. (2) Age of the individual, duration of the disease, and activity of the disease apparently have no great effect upon the metabolic rate in this group of cases. (3) In the infectious type the plus rate was slightly greater than the minus. But in the atrophic, and especially in the hypertrophic, the tendency was toward the minus rate. In the latter group only 54 per cent were normal, with the greatest variation from normal of any of the groups. This would be expected, since hypertrophic arthritis occurs in the heavy-boned type of individual with a tendency toward obesity. (4) Inasmuch as this study has shown 39 per cent variation from normal metabolic rates in chronic arthritis, the writers believe that determination of metabolic rate should be made upon all cases of chronic arthritis when possible. (5) Some cases showing a plus metabolism, but with a very erratic and unstable graphic chart, have, after the exhibition of thyroid, dropped to a low minus, and as the thyroid has been increased, the metabolic rate has gradually risen to normal and the chart has become much more stable. This has been ascribed to relief from nervous tension in a potential hypothyroid case. (6) From the foregoing conclusions, it would seem that the use of **Thyroid** in some cases would be of distinct benefit, and this has been borne out by clinical experience.

C. B. Heald[6] discusses *the sacro-iliac problem*, and describes a group of cases which, on account of the exact similarity of signs and symptoms, he considered as being caused by one uniform anatomical injury. The characteristic features were: (1) A history of relatively sudden onset of pain in the back following a muscular movement of the 'surprise' type and quite insufficient to cause a dislocation of a joint the size of the sacro iliac synchondrosis; (2) An inability to cough without pain and without accentuating all symptoms; (3) A complete inability (not necessarily on account of pain) to lie flat on the back and lift both legs (when separated by about six inches) simultaneously off the ground with the knees fully extended. A hypothesis of the possible nature of this anatomical injury is put forward which differentiates it from the ordinary cases of sacro-iliac strain or rupture of the iliolumbar ligament. A line of treatment is suggested which is uniformly successful when the signs and symptoms are limited to those described.

H. Forestier[7] describes the condition of *vertebral fibrositis*, 'cellulite' of the neck. He has observed in rheumatic and gouty patients on the one hand nodules located in the suboccipital region, on the transverse process of the atlas; and on the other hand in the cervical grooves deep-seated thickenings, probably juxta-periosteal, which he believes to be due to 'cellulite'. This cervical 'cellulite' gives rise to headache or to neuralgic pains radiating down the shoulders, the arms, and even the precordial region. For the detection of the cervical 'cellulite' the patient must either sit astride of a plat-backed chair facing the doctor, his arms crossed over the back of the chair, his forehead leaning on his arms, or be simply seated, his head leaning against the chest of the doctor. In either position the muscles of the neck are relaxed to allow of deep palpation. On both sides the tips of the fingers begin first to explore symmetrically the mastoid region and the transverse processes of the atlas. Then, getting nearer the median line, they penetrate the cervical grooves and gradually descend to the shoulders. These conditions are much more frequently met with on the left side. Radiography shows that these nodules and thickenings are not of bony origin, although it may happen that juxta-periosteal 'cellulite' turns into osteoperiostitis, and thus produces a true bony nodule or an exostosis. Such pathological development is pretty frequently met with in gouty or so-called 'arthritic' patients. It is easy enough to differentiate a gland from the nodules or cellular tissue thickenings of the cervical space, for the glands are movable. It is a question of experience and delicate palpation which needs practice and much patience.

The pseudo-cardialgic symptoms are highly interesting on account of the errors of diagnosis to which they may lead. They correspond to the irritation of the roots of the fifth and sixth cervical pairs. The pain is, as in sciatica, increased by effort and cough, and may make the patient anxious about his heart. The treatment at Aix, which consists of **Local Vapour Baths** (radio-active) applied to the neck, followed by general and **Local Douche-massage**, has been most satisfactory. At home, patients may be benefited by hot-air applications and skilled massage.

L. Schmidt[8] says that *minimal rises of temperature* in rheumatoid arthritis, even of only a few tenths of a degree, if continuous and not due to any other cause, are of decided importance from a prognostic as well as from a therapeutic standpoint. The patients mostly state that they have been ill for years, or at least for many months. In spite of various therapeutic measures, the pain, swelling, deformity, and atrophy of muscles and skin slowly increase. He recommends in the first place general treatment as in the case of tuberculosis, and here a so-called '**Mastkur**' (fattening régime), carried out with great care and precision, plays an important part. Objectively, improvement becomes manifest in two directions: the body weight increases and the small rises of temperature tend to disappear, though in some cases only after a considerable time. The second essential in treatment is **Recumbency**, either absolute or partial according to the severity of the affection. He enjoins that the patient must be guarded from the various harmful forms of treatment which are sometimes warmly recommended. He refers particularly to the routine ordering of massage, diathermy, and radiant heat when the patient is in a negative phase, and incapable of favourable reaction, which is an important principle of all forms of inoculation therapy.

TREATMENT.—In a contribution on the subject of chronic rheumatic conditions, Sir William Wilcox[9] states that 'infection' must be regarded as the primary cause in the great majority of cases. A systematic and exhaustive search should be made for a focus of infection. The septic stumps of tonsils which have been partially removed are not infrequently the cause of arthritis. Examination of the accessory sinuses can only be done properly by an expert. The treatment of these conditions has been fully dealt with in recent numbers of the ANNUAL. A gross focus of causal infection should first of all be removed, and spa treatment, when available, advised afterwards. Colon infection is present in most cases, and **Colon Lavage** or **Plombières Treatment** two or three times weekly is of value, especially in long-standing cases. This can be done quite easily at home by a skilled nurse. **Tincture of Iodine** (French P. preparation, without potassium iodide) is useful, commencing with five drops in a wineglassful of milk or water three times a day after meals.

K. Stone,[10] writing on the fundamental principles in the **Vaccine** treatment of chronic arthritis, states that there is experimental evidence that a normal animal's joints can be made sensitive to streptococci, and thus rheumatoid arthritis may be a result of a long succession of allergic reactions occurring in joints sensitized to streptococci. The type of case in which vaccine therapy is likely to be of most value is the early case of rheumatoid arthritis. An autogenous vaccine should be used whenever possible in addition to removal of the focus. When no infective focus can be found, he recommends a vaccine containing a typical example of each of the three main groups of streptococci: *salivarius*, *fæcalis*, and *pyogenes*. Though *pyogenes* is probably never concerned in the causation of rheumatoid arthritis, it is a useful addition, for there is evidence that it stimulates the production of 'antibodies' which react to a definite extent with examples of the *salivarius* and *fæcalis* groups. Very small doses of vaccine and a gradual increment are recommended so as to avoid reactions, which do more harm than good. Prolonged treatment is also advised.

V. Coates[11] states that too narrow a view is now held of the condition formerly called rheumatoid arthritis, and now known as infective or focal arthritis, and from the therapeutic point of view the condition should be regarded as a systemic infection and not as a disease of joints. This view calls for more comprehensive methods of treatment, the essentials of which are *a raising of the individual's immunity* and the *correction of biochemical abnormalities*: the former implying the principles of treatment commonly applied to the actual stage of, say, tuberculosis; and the latter, adjustment of departures from the normal in each system, the alimentary, the hæmopoietic, etc., stage by stage. Active joint treatment is not discussed. The removal of infective foci, when present and obvious, should automatically take place, not necessarily in the hope of immediate results, but as a routine to relieve the individual from any embarrassing load factor. Amongst measures of intestinal disinfection Coates favours **Calomel** in doses of $\frac{1}{6}$ gr. every hour for six doses on alternate days, followed by a saline the next morning. Another method found most efficacious in some instances is that of changing the pH value of the intestinal medium by administration of pure cultures of lactic acid bacilli in milk twice a day. **Plombières Douches** have been found extremely useful on the whole, and are always worth consideration. **Guaiacol Carbonate** with **Sublimed Sulphur** in cachets over a long period of time is a routine of long standing. The administration of **Streptococcal Vaccines** would seem to be most indicated where there is an associated nasopharyngeal involvement, especially when allergic in origin. In the atrophic form of arthritis achlorhydria is exceedingly common, and if the result of a fractional test-meal proves this to be the case, **Hydrochloric Acid** well diluted should be given at meal-times. Moderately severe secondary anæmia is usual in infective arthritis. This has to be combated by the methods usually adopted in secondary anæmia, such as **Iron** and **Arsenic** by the mouth or injections of **Serum Ferrugineux,** but it is not unusual in chronic cases to find a fatigued bone-marrow, and recently **Liver Feeding** has produced some hopeful results. The value of skilfully given **Massage** as a general measure in infective arthritis is too well known to need comment, but **Hydrotherapy** (though its indiscriminate use in the acute and subacute stages has brought discredit on many spas) is useful, when properly applied, throughout the course of the disease, quite apart from the question of joint treatment, as a general sedative or stimulant to metabolism, to induce sweating, and ensure sleep.

J. E. Cottrell[12] reviews the present position of our knowledge of the treatment of arthritis with salts of **O-Iodoxybenzoic Acid.** The systematic use of the drug in the treatment of arthritis was initiated by Young and Youmans (*see* MEDICAL ANNUAL, 1928, p. 46). We can say at present that certain cases of arthritis, of various types, are definitely benefited by treatment with the drug. The results of treatment in Cottrell's series of 21 cases were encouraging. He suggests the following scheme of treatment: (1) A search for, and treatment of, foci of infection. (2) Administration of ammonium o-iodoxybenzoate intravenously in doses of 1 grm. semi-weekly for 6 or 8 doses; subsequent courses may follow at intervals of three to six weeks, or longer. If intravenous injection is impossible, the drug may be administered by mouth (calcium salt) or by rectum (ammonium salt). (3) Concomitant and persistent use of physiotherapy in chronic cases. (4) Orthopædic treatment of deformities. It must be remembered that the drug is only one factor in the treatment, and that other resources must be fully used, and in chronic cases the treatment may be persisted in for months or years.

N. C. Trauba[13] reports that the results of 31 cases of chronic infective arthritis treated with intravenous, oral, or rectal administration of o-iodoxybenzoic acid show 16 per cent markedly improved, 16 per cent moderately improved, 32 per cent slightly improved, 29 per cent unimproved, and 2 cases, or 7 per cent, of improvement due to other therapeutic measures. A 1 per cent solution of the ammonium salt was prepared by dissolving 1 grm. of the salt in 100 c.c. of boiling distilled water and filtering. This solution constituted one intravenous dose, which was given within one hour after preparation. A course of treatment consisted of 8 injections given biweekly. The initial dose was 50 to 75 c.c. of the solution, and the remaining seven doses consisted of 100 c.c. each. Because of the discomfort produced by the intravenous route, oral administration was tried. The drug was put up in 0·5 grm. capsules coated with phenyl salicylate; one such capsule was given the first day, and two capsules daily for the succeeding thirteen days. A rest of fourteen days was given before repeating the course in some of the cases. The results, while not as marked as those obtained by Young and Youmans and by Smith, are nevertheless encouraging. More study is necessary to determine the most efficacious form of the drug, the best method of administration, the size and frequency of dosage, and the mode of action.

REFERENCES. [1]*Practitioner*, 1927, Oct., 252; [2]*Med. Jour and Record*, 1927, Nov., 563; [3]*Canad. Med. Assoc. Jour.* 1927, Aug., 907; [4]*Jour. Amer. Med. Assoc.* 1925, lxxxiv, 537; [5]*Boston Med. and Surg. Jour.* 1927, Sept., 350; [6]*Lancet*, 1928, ii, 66; [7]*Ibid.* 1927, i, 65; [8]*Brit. Med. Jour.* 1928, i, 493; [9]*Practitioner*, 1927, Aug., 69; [10]*Ibid.* Sept., 176; [1]*Brit. Med. Jour.* 1928, ii, 9; [12]*Amer. Jour. Med. Sci.* 1927, Nov., 623; [13]*Jour. Amer. Med. Assoc.* 1927, Oct., 1124.

ARTHRITIS, SUPPURATIVE.

Sir W. I. de C. Wheeler, F.R.C.S.I.

In cases of acute infective synovitis the affected joint usually assumes the position which is most useless in the event of subsequent ankylosis; thus the knee, wrist, and hip are flexed, the shoulder adducted, the elbow slightly extended, and the ankle plantar-flexed. Pyrexia is present, and a high leucocyte count is to be expected. In a typical case the disease is limited to the synovial membrane at first, but soon spreads to the cartilage and bone, the limb wastes, and the temperature remains high. In the very acute cases of suppurative arthritis the condition must be regarded in the same light as acute septic osteomyelitis; the patient is dangerously ill, and if death does not occur from pyæmia, the local disease spreads, softening and destroying the ligaments and invading the muscular planes. Deformities increase, sinuses form, and finally there is ankylosis in a faulty position.

TREATMENT.—

1. In cases which are not hyperacute, the limb should be immobilized on a Thomas splint, leaving the joint exposed. The nature of the fluid is ascertained by means of a needle and syringe. If the fluid is serous, aspiration should be resorted to and repeated as often as necessary. Some pressure should be applied to the joint to favour absorption by means of layers of wool and a crêpe elastic bandage. With a lessening of the fluid the limb may be gently moved once a day to prevent the formation of adhesions. It is best to allow the patient to carry out the movements himself. If the disease is too active or the joint too painful for this voluntary movement, rest on the splint, with aspiration if necessary, should be continued. The best splint for the knee, hip, and elbow is the Thomas variety. Extension should be applied to overcome muscular spasm.

2. In a persistent case, especially if the fluid is turbid, two needles are entered into the joint. The fluid is aspirated through one. **Saline Solution** is then introduced through the other. Two or three drachms of a 2 per cent solution of **Glycerin** and **Formalin** should be introduced into the joint before removal of the needles.

3. If fixation, extension, and aspiration in the manner described fail to produce the desired effect after repetition, the joint must be opened and thoroughly irrigated, but no drainage tubes inserted. Voluntary movements may be started early.

It will be remembered that Willems[1] advocated free incision into the joint with immediate **Mobilization.** He believes that movement is the most effective method of getting rid of the pus. In the case of the knee-joint, very free incisions are made on either side of the patella, opening up the suprapatellar pouches. In the case of the elbow, incisions are made on both sides of the olecranon; in the shoulder, a free incision along the bicipital groove; in the wrist the openings are made between the tendon-sheaths. No drains of any kind are introduced, and the movements are active and not passive. They are continued both day and night, the patient being awakened if necessary every two hours. In the case of the knee the patient is encouraged to move it as soon as possible. The method is described in Jones and Lovett's *Orthopædic Surgery* (p. 282 et seq.). It has not found favour in Great Britain, but may be applicable to some special cases.

All traumatized or infected tissues should be excised in open traumatic cases, and the joint closed without drainage. Ten to twenty c.c. of a 2 per cent solution of **Liquor Formaldehyde in Glycerin** may be injected, or **Bipp** rubbed in before closure. The joint should be aspirated and reinjected in twenty-four hours if the tension is great. If the temperature is rising the aspiration and injection should be repeated in two, three, or four days, depending on the severity of the case. Usually three or four injections suffice to sterilize the joint completely. The joint should be immobilized and heavy extension applied. This is easily accomplished in most instances by the Thomas splint.

When there are multiple injuries to a limb and laceration of soft parts, it is often impossible to apply extension by adhesive strapping. It is sometimes forgotten that a modern steel pin is a very simple alternative. The pin is supplied with a handle, and with very little effort can be passed through the femur above the condyles, the tibia behind the attachment of the ligamentum patellæ, or the os calcis. A wire loop is attached to the pin. Through this medium extension is made.

The clinical teaching of the late J. B. Murphy in connection with metastatic infections of bones and joints is illuminating even in the light of present-day knowledge. He showed that micro-organisms carried from distant lesions infect the bones and joints at different dates; thus, from 18 to 22 days after the commencement of the urethral discharge, the knee-joint or the astragalo-scaphoid joint commonly is the site of gonococcal arthritis. Metastatic arthritis never appears in the early stage of any of the exanthematous diseases except scarlatina. Metastatic joint infections, unless well treated, will always lead to the destruction of the joint when they are initiated by a rigor. The rigor means that virulent micro-organisms are passing through the blood. There are only two tissues in and at the joint that become infected, viz., the synovial membrane and the bone. The cartilage and fibrous capsule, owing to complete or partial absence of vascular supply, are never the sites of primary infection. The micro-organisms reach the synovial membrane by the blood and remain beneath the endothelial layer. Effusion takes place into the joint long before the micro-organisms appear on the synovial surface or in the fluid. For these reasons cultures and smears made from aspirated or other fluid give negative results unless in the very acute streptococcal cases. Murphy showed clearly that every type of non-traumatic joint inflammation is a metastatic manifestation, and that there is no such condition as idiopathic peritonitis or idiopathic rheumatic arthritis. The influenzal infection of joints occurs between the tenth and fourteenth days after the manifestation of the primary infection. Furuncular infections, usually of the staphylococcus type, show their metastases in the joints on the ninth to the eleventh day. The streptococcic infections (including scarlatina) can cause metastatic arthritis within 48 to 72 hours. In contrast to these we have the very late manifestations of the arthritic and osseous infections occurring in typhoid. These come on from the fourth to the eighth week, or about the time when the ulcers are healing or healed. The term 'rheumatism' should be expunged from medical nomenclature.

The polyarticular variety in joint infections is rarely initiated with a chill and rarely leads to bony ankylosis. It is the result of the milder types of microbic infection.

REFERENCE.—[1] *Med. Record*, 1919, xcv, 999

ASBESTOSIS, PULMONARY. (*See* PULMONARY ASBESTOSIS.)

ASTHMA AND HAY FEVER.

W. H. Wynn, M.D., F.R.C.P.

Our knowledge of the inheritance of the allergic group of diseases has been added to by A. Eliot Smith's study[1] of five generations of a family comprising 94 persons of whom 56·2 per cent suffered from one or more of the following allergic manifestations: asthma, hay fever, vasomotor rhinitis, urticaria, angioneurotic œdema, and eczema; twenty-three unrelated persons who married into the family were used as controls, and among these only one was allergic. The results of the survey suggested that the factor for hypersensitiveness was inherited as a dominant, and also that given forms of allergic manifestations apparently tend to be prevalent among closely related persons.

H. W. Barber and G. H. Oriel[2] have made important biochemical studies of allergy in patients presenting a syndrome which comprised Besnier's prurigo, asthma, and eczema as the cardinal symptoms. On the basis of repeated examinations of the blood and urine, they found the same cycle of events in all the allergic conditions investigated. There seemed to be a 'biochemical formula' common to all. They recognized a pre-paroxysmal, a paroxysmal, and a post-paroxysmal stage. The investigations were begun in order to determine the part played by the liver in allergic conditions. They find that during acute paroxysms the amino-acid content of the blood is raised, and that high figures are often also obtained even during periods of comparative quiescence. Blood chlorides are markedly diminished during paroxysms, and the reduction of the corpuscle content is greater than that of the serum. Uric acid and creatinine are apparently increased. In the period just preceding and during the paroxysms the changes in the urine are: the free acidity rises; urates are often deposited when the urine cools; diminished water excretion, so that the specific gravity is usually high; retention of chlorides; ether reaction strongly positive; ammonia excretion rises and the ratio of free acid to ammonia-combined acid is altered; excretion of amino-acid, creatinine, and uric acid begins to rise. In the period following the subsidence of the paroxysm, the blood shows a fall of amino-acid content, diminution of uric acid and creatinine, a rise in the chlorides of the whole blood; in the urine the free acidity rapidly and progressively falls and the urine tends to become neutral and finally alkaline; there is increased secretion of water, so that the volume is raised and the specific gravity falls; the excretion of chlorides is increased; the ether reaction diminishes: the excretion of ammonia begins to fall but lags behind the diminishing excretion of acid, and the excretion of uric acid, amino-acid, and creatinine gradually falls. The ether reaction mentioned above is performed as follows: To a few cubic centimetres of urine are added a little 25 per cent sulphuric acid and then sufficient ether to form a layer above the urine of about half an inch. The mixture is well shaken and allowed to stand. The layer of ether becomes frothy, and if the reaction is positive the froth in its lower part becomes viscous and opaque like melted wax after ten minutes or so. It probably depends, like the deposition of urates, upon an alteration in the colloid state of the urine. Most of the cases also gave a positive indirect van den Bergh reaction. These investigations were chiefly concerned with the dermatological manifestations of allergy with which asthma was often associated, but are apparently applicable to cases of pure asthma. It is possible that the raised amino-acid content of the blood in these cases results partly from: (1) the increased endogenous catabolism that occurs in anaphylactic and allergic reactions as shown by the increased formation of creatinine; (2) the relative hepatic insufficiency caused by the damage to the liver cells, as evidenced by the positive van den Bergh test; (3) the interaction of the antigen and the 'defence-ferments' of Abderhalden whereby amino-acids are formed. In any case the positive van den Bergh reaction, the raised amino-acid content of the blood, and probably the increased ammonia excretion, the precipitation of urates, and the ether reaction in the urine, are indicative of a disturbance of hepatic function. It is likely that the increased ammonia excretion, and the temporary retention of chlorides, are protective mechanisms.

TREATMENT.—Barber and Oriel[2] suggest a **Lactovegetarian Diet** and the internal administration of **Ammonia** and **Glucose**, and find these lines of treatment to have a definite therapeutic value in allergic cases.

H. Lilienthal[3] points out that the effect of **Epinephrin** can be prolonged by massaging the site of injection. For instance, in a woman in whom epinephrin gave temporary relief, an injection into the subcutaneous tissue over the deltoid was made, the dose being 5 min. of the 1–1000 solution. For nearly forty-eight hours the patient was able to relieve asthmatic attacks by massaging the deltoid region, and this entire experiment of injection and massage was repeated several times.

Ephedrine is now being extensively used for the relief of paroxysms of asthma and hay fever. G. Piness and H. Miller[4] have used it in 110 cases of asthma and 20 of hay fever. The dosage was 50 mgrm. for adults and 25 mgrm. for children, always by mouth. They found the administration most effective when given just before the time of an expected attack or during the prodromal period. When nocturnal attacks were expected a patient was often able to maintain complete freedom by using the drug at bedtime. Administration on an empty stomach was more efficacious. Reviewing their cases, they conclude that mild attacks were usually completely aborted, moderately severe attacks partially relieved, and severe attacks only occasionally relieved. The patients who did not obtain relief were those suffering from a more or less constant and severe type of asthma. They found that each succeeding dose may become less and less effective.

T. L. Althausen and I. C. Schumacher[5] found that ephedrine gave complete relief in 56 per cent of their patients and partial relief in 24 per cent. In 8 per cent there was no relief, and in 12 per cent failure was due to untoward symptoms. Compared to epinephrin, ephedrine acted more slowly and less completely, but its action continued much longer. They warn against the administration of ephedrine with epinephrin, as the combination is apt to cause severe nausea and vomiting. The patients in whom marked undesirable effects were found were especially those who had received epinephrin up to the time when ephedrine was substituted. They found that ephedrine caused a similar rise in blood-pressure to that in patients free from asthma. Disagreeable effects were found in 30 per cent, chiefly in the form of nausea, nervousness, palpitation, insomnia, and rarely constipation and diuresis.

F. W. Gaarde and C. K. Maytum[6] have used ephedrine for hay fever. It was given to twenty-four patients by mouth in capsules of 25 mgrm., of which not more than two were taken in twenty-four hours, and twenty-five used a nasal spray of a 3 per cent solution. They found that, given by mouth, temporary relief was obtained in rather more than half the cases, and another quarter of the cases obtained sufficient relief to warrant its use. The nasal spray was less effective, but patients felt that it added to their comfort, especially when used early in the paroxysm.

G. L. Waldbott[7] has treated 81 patients with asthma and associated allergic conditions with small doses of **X Rays over the Spleen**; 56 were children and 25 were adults. There was failure to get benefit in 39·4 per cent of the children and 52 per cent of the adults. Patients less than 4 years of age gave the best results, and it was least effective in those over 30. In some who improved, positive skin tests became negative within the first week. As a rule the number of eosinophils increased immediately after the treatment. Of a total of 169 exposures, 37 were followed by reactions characterized by vomiting, nausea, abdominal pain, or an asthmatic attack from one to five days after treatment. Better results were obtained in patients who had a reaction. It is suggested that the destruction of splenic tissue might act as a method of foreign protein therapy. A warning is given against the indiscriminate use of the treatment, which should be applied only in cases of allergy which have not responded to ordinary methods.

REFERENCES. [1]*Arch. of Internal Med.* 1928, April, 472; [2]*Lancet*, 1928, ii, 1010 and 1064; [3]*Jour. Amer. Med. Assoc.* 1928, i, 1192; [4]*Ibid.* 1927, ii, 515; [5]*Arch. of Internal Med.* 1927, Dec., 851; [6]*Amer. Jour. Med. Sci.* 1927, Nov., 635; [7]*Arch. of Internal Med.* 1928, May, 683.

ASTHMA, CARDIAC. (*See* CARDIAC DYSPNŒA.)

ATLAS, INJURIES OF.

Geoffrey Jefferson, M.S., F.R.C.S.

Fractures.—Some years ago the reviewer reported a series of fractures of the atlas vertebra, and in a more recent paper[1] has brought the matter up to date. The total number of cases recorded is 65. It would naturally be concluded that these injuries are usually fatal, but such is far from being the case. Of thirty-two cases reported since 1900 only six have died. The reason is simple. The atlas can only be broken by pressing the head violently down on to the spine. The occipital condyles thrust the lateral masses of the atlas outwards and break the bone apart by tension. The bone fragments tend to move, therefore, away from the cord (*see* MEDICAL ANNUAL, 1921, p. 425). Injuries of the upper two cervical vertebræ are no doubt much more common than has been thought, for most of us have been brought up to understand that any injury to the atlas, axis, or odontoid must be fatal. The lesson to be learned is that these bones may be broken without sufficient displacement of fragments to embarrass the cord, so that the patient survives to complain of a stiff and painful neck that may be woefully wrongly misinterpreted unless one is on one's guard. There were no cord injuries in the reviewer's four personal cases; it was simply the severe pain which led to X rays being taken and the condition thus revealed. All recovered, though some limitation of movement resulted.

Dislocations.—Corner, some years ago, made the rotary dislocation of the atlas a subject of his own, and contributed largely to an understanding of a lesion of which little was known. These injuries are not very common, but the fact that R. H. Jackson[2] has had four in his own practice reminds us that we must watch for them. The history given is similar to that in atlas fracture—an injury to the head which has caused a screw-movement. The patient will naturally often be unaware of this latter point; he is but conscious of severe pain in the neck following an injury to the head, and—the essential point—he cannot turn his head as he should, and the attempt increases the pain. Often the attitude is that of a case of torticollis, and such a posture resulting from an injury should bring the possibility of rotary dislocation into the observer's mind. Inability to open the mouth fully or to swallow freely is not uncommon. One of Jackson's cases lost 14 lb. weight in a month from this cause. All writers are agreed that a prominence can be felt in the pharynx on digital examination. Once the diagnosis is made the treatment is obvious enough. Reduction can sometimes be made without an anæsthetic, and a definite 'click' may be heard, with immediate return of full scope of movement. A plaster collar should be applied for a term of three or four weeks to allow the ligaments to heal. As with all dislocations, the time element is important; for if joint surfaces are left out of position for long, reduction may become very difficult. In one of Jackson's cases the dislocation had occurred three months previously, and open reduction had to be resorted to; this was not easily effected, even with the joints exposed.

REFERENCES.—[1]*Brit. Med. Jour.* 1927, ii, 153; [2]*Surg. Gynecol. and Obst.* 1927, Aug., 156.

AURICULAR FIBRILLATION AND FLUTTER. (*See* ARRHYTHMIA.)

BACKACHE. (*See* SPINE, AFFECTIONS OF—SACRO-ILIAC STRAIN.)

BALANTIDIUM DYSENTERY. (*See* DYSENTERY, BALANTIDIUM COLI.)

BERI-BERI.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

ETIOLOGY.—Interesting work on this subject has been recorded by R. McCarrison, E. R. Sundararajan, and T. H. Gloster[1] through extensive experimental feeding of pigeons with diets deficient in vitamin B by the first-named. It has for long been recognized that the polyneuritis produced in pigeons by vitamin-B-free diet differs from beri-beri in man in the absence of the hypertrophy and dilatation of the heart of the human disease, and the most important discovery recorded in this paper is that by feeding pigeons on diets with greatly reduced vitamin B, but not free from it, both polyneuritis and cardiac enlargement and dilatation are produced as in man, which goes a very long way to support the general view that vitamin deficiency is the cause of beri-beri. A mathematical analysis is given to prove that the experiments did demonstrate this point, while the last-named contributor deals with aerobic sporing bacilli found in rice, and shows that no one organism was present sufficiently often to indicate any bacterial element in the production of beri-beri, although it is not denied that the somewhat similar disease, epidemic dropsy, may possibly be due to toxins produced in badly preserved rice by bacterial action. It is proposed to call the disease produced in pigeons by deficiency of vitamin B beri-beri columbarum, to distinguish it from the formerly described polyneuritis columbarum due to total deprivation of vitamin B.

Epidemic Dropsy.—An outbreak of this form of the disease in Fiji is recorded by A. D. Sagayam ;[2] it was widespread in the colony, and showed the usual well-marked œdema of the feet and anæmia. Rice was first suspected, but would not explain the incidence, and it was eventually found that mustard oil was responsible, for only the cooks in the jail, who had an extra amount of this, were attacked, and cases ceased on withdrawing the oil, while only Indians, who consumed mustard oil, were attacked outside the jail. The Editor of the *Indian Medical Gazette* adds a note to the effect that the evidence is not inconsistent with the possibility that an infected supply of rice from Calcutta might have been the cause of the outbreak, as mustard oil is taken with rice by Indians.

R. N. Banerji[3] reports an epidemic in Allahabad of the dropsy type of beri-beri, in which Bengalees, living on an excessive carbohydrate diet, were exclusively attacked, and Mohammedans on a more varied diet escaped. He considers that the disease looks like a 'rice-intoxication' or a 'toxi-infection'. A preliminary inquiry into beri-beri in Burma by J. Taylor and C. de C. Martin[4] shows that the disease is rare among Burmans and Mohammedans, who live on a varied diet, but it occurs more among immigrant Hindus, who eat an almost exclusively rice diet. There is a seasonal rise, with very high humidity, during the monsoon months, when rice is liable to deteriorate and become mouldy.

REFERENCES.—[1] *Ind. Jour. Med. Research*, 1928, March, Memoir No. 10; [2] *Ind. Med. Gaz.* 1927, Sept., 506; [3] *Ibid.* 1928, April, 190; [4] *Ind. Jour. Med. Research*, 1928, March, Memoir No. 8.

BILHARZIASIS. (*See* SCHISTOSOMIASIS.)

BLACKWATER FEVER. (*See* MALARIA.)

BLADDER, DISEASES OF.

Sir John Thomson-Walker, F.R.C.S.

Cystography.—B. H. Hager and W. F. Braasch[1] use a 5 per cent emulsion of **Silver Iodide** for cystography, as it is not only an excellent contrast medium but is soothing and antiseptic. Distension of the bladder with atmospheric air or oxygen is, they consider, less satisfactory for this purpose. The technique employed at the Mayo Clinic is as follows: Simple X-ray photographs of the bladder area are first taken in all cases. The cystographic medium is injected by catheter until the patient expresses a desire to micturate, when the catheter is withdrawn. Three film exposures are then made; for the first two "the patient is placed in the reverse Trendelenburg position with the table at an angle of 10° towards the foot. The Coolidge tube is placed at an angle of 5°, which makes a total of 15° inclination towards the foot. The tube is also tilted at an angle of 8° to each side in order to secure lateral exposures." The bladder is then emptied by catheter preparatory to taking the third film, taking care to exert no pressure whatever over the bladder

When the bladder is empty, the table is "tilted 10° with a 5° angulation of the Coolidge tube, making this also an angle of 15°". The third film is then taken in the anteroposterior plane, without any lateral angulation of the tube. It is very important to have the bowel well prepared before carrying out this investigation.

Cystoscopy Reactions.—H. L. Wehrbein[2] has investigated the incidence and severity of cystoscopy reactions observed in the urological department of Bellevue Hospital, New York. For purposes of comparison, a positive reaction was regarded as a rise of temperature within twenty-four hours of the examination which exceeded the highest temperature noted during the three preceding days by 2°, and for which no other cause could be found. Symptoms such as hæmaturia, painful micturition, and lumbar pain were noted, but were not recorded as constituting reactions in themselves. Altogether 828 cystoscopies with ureteral catheterization were considered, in 215 of which pyelography was carried out in addition, 12 of the latter being bilateral. Stated briefly, the writer's conclusions were that the presence of infection and of traumatism were the most important factors in the causation of reactions, which were found to be far more common in men than in women. Reactions occurred in 21·7 per cent of the male patients as compared with 4·2 per cent in the females. Pyelography was followed by 20·7 per cent of reactions, and simple ureteral catheterization by 14·3 per cent. Bilateral pyelography was followed by 41·7 per cent of reactions. The writer emphasizes the importance of skill and gentleness on the part of the operator, and this aspect of the investigation was considered by a careful comparison of the number of reactions following the manipulations carried out by three different surgeons.

Retention of Urine.—H. M. Hinrichsen[3] has treated thirty-eight cases of post-operative retention of urine with success by the intravenous injection of 0·01 grm. (⅙ gr.) of **Pilocarpine Hydrochloride.** The injection is given very slowly, and is not commenced until the bladder has risen to a level of some 3 in. above the umbilicus.

Tuberculous Cystitis.—Masses of granulation tissue are not infrequently observed in chronic tuberculous cystitis and may occasionally be mistaken for new growth. J. J. Joelson and W. E. Lower[4] describe a case where a reddish tumour was present in a bladder otherwise normal. A diagnosis of carcinoma was made and the tumour removed by resection. On microscopical examination the mass proved to be tuberculous, and on subsequent examination there was found to be tuberculosis of the left kidney. Two cases are also described where pelvic inflammation caused a localized tumour of the bladder covered by villi and giving rise to a mistaken diagnosis. (*Plate VIII.*)

Tumours.—A tumour of the bladder (*Plate IX, A*) occurring in a woman, age 42 years, which on microscopic section was found to consist of gland acini lined with a deep columnar-celled epithelium in a delicate vascular stroma, is described by A. C. Morson.[5] The epithelium was regular in arrangement and was limited by the basement membrane, but showed active proliferation of its cells within the acini. The histological appearances (*Plate IX, B*) were very similar to those of the endometrium, and the writer is of opinion that this tumour was of the nature of an *endometrioma*. The clinical features resembled in every respect those found in three cases of vesical growth which occurred in women, were characterized by severe hæmaturia, and which had been reported in the literature as adenomata of the bladder. The writer considers that the theory which best explains the origin of such tumours is that they arise as the result of a metaplasia of the peritoneal endothelium due to some long-continued irritation. The correct treatment is complete removal by **Partial**

PLATE VIII

TUBERCULOUS CYSTITIS

[illegible] AND W. E. LOWER

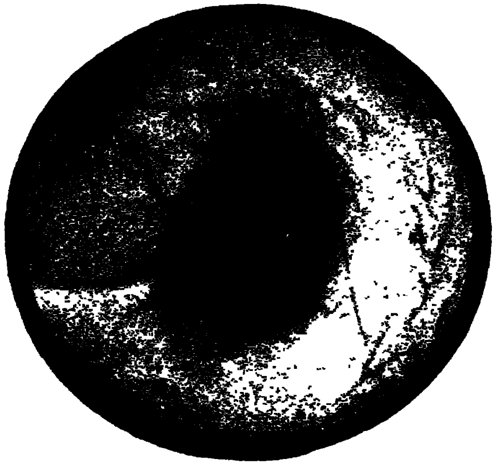

Fig. A.—A tuberculoma surrounding and occluding the left ureteral orifice in a case of left renal tuberculosis. The remainder of the bladder was essentially normal.

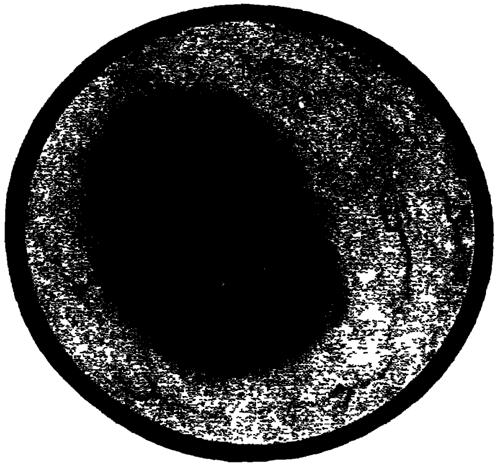

Fig. B.—An inflammatory reaction in the wall of the bladder secondary to a contiguous tuberculous inflammation of the remaining portion of the [illegible]

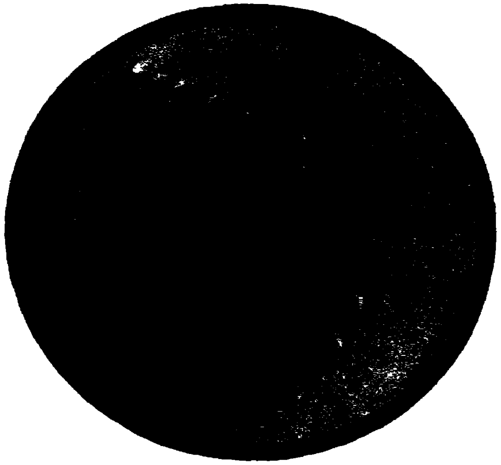

Fig. C.—The left margin of an extensive inflammatory reaction in the wall of the bladder secondary to an adherent inflamed tube and ovary, probably tuberculous.

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PLATE IX

TUMOUR OF BLADDER

(A. C. Morson)

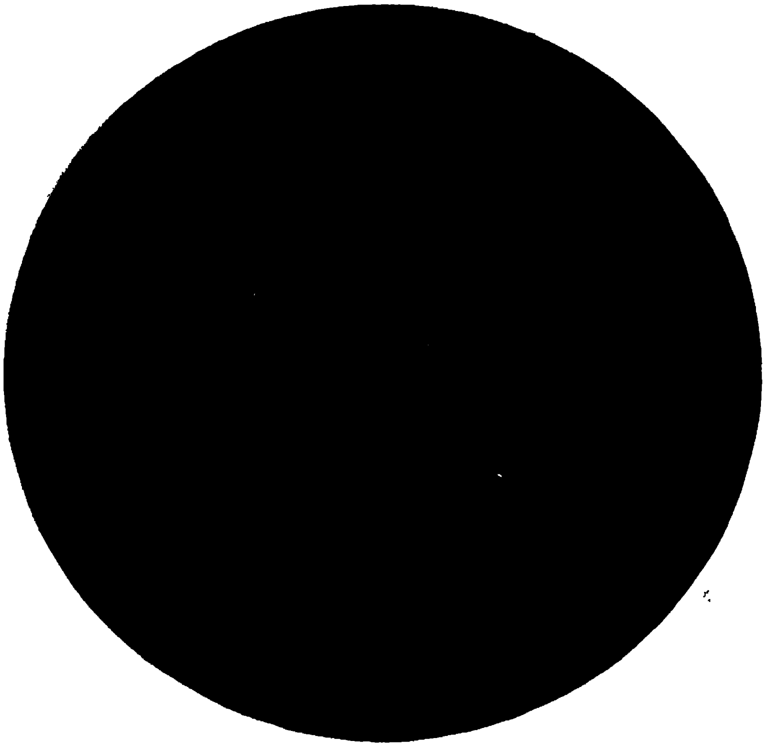

Fig. A. Appearance of tumour before diathermy treatment was commenced.

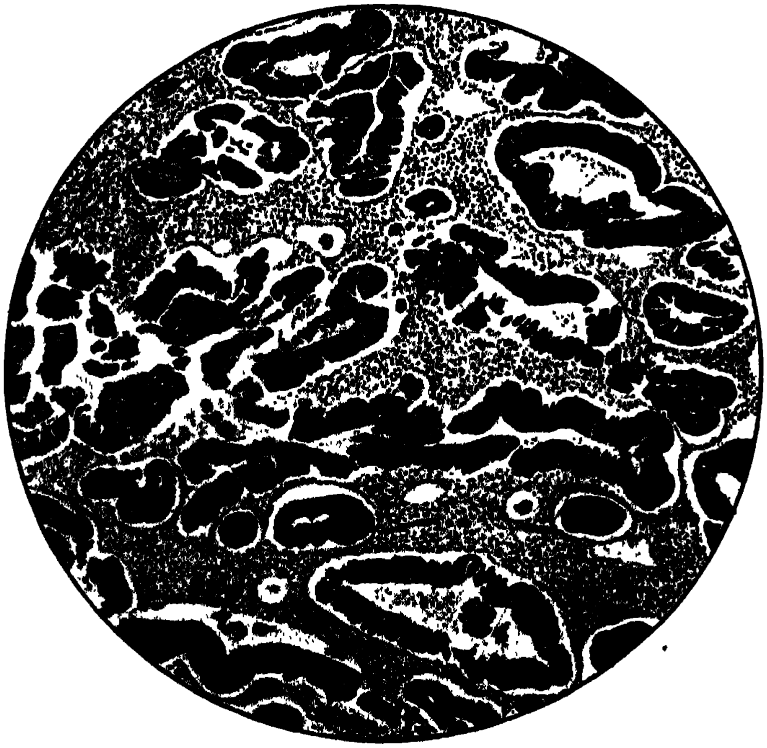

Fig. B. Drawing of a microscopic section of a part of the tumour which resembles the glands of the uterus. (× 54.)

By kind permission of the 'British Journal of Surgery'

Cystectomy, rather than to attempt the destruction of the growth by means of the high-frequency current.

During the past eight years some fifty cases of tumour of the bladder have been treated at the University Clinic of Berlin by the introduction of a solution of freshly prepared **Trichloracetic Acid** directly on to the surface of the growth by means of a ureteral catheter passed through a cystoscope, and L. S. Drexler and W. Ginsberg[6] describe the method. The solution is made by heating the crystals in a test-tube until they become fluid. To each 5 c.c. of this solution 5 drops of glycerin are added. The test-tube containing the solution is then placed in a glass of warm water to prevent recrystallization before using. One c.c. of the solution is drawn into a glass syringe, and while the cystoscopist directs the catheter over the upper surface of the tumour mass, an assistant slowly forces the solution through the catheter, using from 20 to 30 drops. Tumours in the bladder so situated as to be inaccessible to the cystoscope can be treated with frequent instillations into the bladder of 40 to 50 c.c. of distilled water containing 20 to 30 drops of trichloracetic acid. This is a useful means of checking persistent hæmaturia from a bladder growth. " At the end of two to three weeks the tumour mass has either entirely disappeared and has been replaced by scar tissue, or has been markedly reduced in size and is ready for further treatment." This treatment is indicated in those cases of vesical carcinoma which have become necrotic and are giving rise to bleeding and secondary cystitis, in that it secures comfort and prolongs life by clearing up the local condition.

In an article on the use of *physical agents* in the treatment of tumours of the bladder, E. Beer[7] states that the results are not yet satisfactory. With regard to the treatment per urethram of benign papillomata with the **High-frequency Current,** the writer calls attention to the effects of the Oudin monopolar and the D'Arsonval bipolar high-frequency currents in order to emphasize the differences that exist between them. The potential of the Oudin current is high, while that of the D'Arsonval method is much lower, whereas the amperage of the latter is higher than that of the former. With the Oudin monopolar current more extensive local effects are produced, but the distant effect is less active. Inside the bladder filled with water, with the Oudin current this distant action is seen in the blanching of large branches of the tumour more often than with the D'Arsonval current, because the monopolar current attaches the growth to the electrode more readily. The innumerable contacts with the bladder wall being broken, the current concentrates in the isthmus and coagulates its structures. As the D'Arsonval current fails to produce this firm attachment between itself and the fronds, one does not get this ideal distant effect so regularly, although it does occur. On the other hand, in the open bladder one gets this effect regularly with the D'Arsonval current. Only benign growths should be treated by trans-urethral application of the high-frequency current, and in cases of doubt lack of adequate response to this form of treatment is an important point in favour of the growth being a malignant one. Benign cases which do not lend themselves to cystoscopic treatment, such as extensive papillomatosis, tumours at the neck or in inaccessible situations, or tumours that bleed profusely at every examination, are better treated by open operation. The writer has obtained excellent results in 158 cases treated per urethram. He has found recurrences in about 20 per cent of cases, either in a new situation or on the site of the original growth. The latter are due to incomplete destruction, and the former to growths which have been overlooked or to entirely new formations resulting from the original causative agent. Treatment of benign papillomata through the open cystotomy wound by means of the high-frequency current calls for extreme care to prevent implants. The writer considers that flooding the wound with strong **Alcohol**, which coagulates potential implants (free tumour cells), has been of the greatest value. This procedure was carried out in thirty-three cases, with a mortality of 12 per cent and recurrence in 15 per cent. The writer describes his experience in the treatment of vesical carcinoma by **Operation**, by means of **Radium** applied trans-urethrally or through a cystotomy wound, and finally by deep **X-ray** therapy.

B. S. Barringer[8] and E. L. Keyes[9] discuss briefly the technique employed by them in the treatment of carcinoma of the bladder with **Radium**, and give a summary of the results they have as yet obtained. The latter has tabulated the end-results in cases treated up to the end of 1922. Favourable results were obtained in 11 out of 20 cases of 'papillary carcinoma', in that they remained apparently cured for five years. Of 51 patients with 'infiltrating carcinoma' also treated with radium, 12 have remained apparently cured for five years.

Diverticulum.—The indefinite and variable symptomatology of diverticulum of the bladder is well known. W. S. Pugh[10] regards micturition in two parts as the only characteristic symptom, but this symptom may be observed apart from diverticulum. Cystoscopy is the most important method of diagnosis, but this author states that there are some cases where cystoscopy may fail. Cystography is the most exact method of examination in these cases. Pugh uses a 5 per cent solution of '**Neosilvol**', which is less irritating than sodium iodide solution.

C. Stirling and H. W. Rollings, jun.,[11] report twelve cases of diverticulum of the bladder, six of which presented unusual features. In one a dumbbell-shaped stone was found in bladder and diverticulum; in another, a diverticulum of the ureter was associated with that of the bladder; in the third, a very large diverticulum was associated with eight smaller ones; in the fourth, a large vesical diverticulum was present in the bladder of a female patient in whom was no urethral obstruction; in the fifth, both ureters opened into a diverticulum, and associated with this condition was marked bilateral hydro-ureter and hydronephrosis; while in the last, a large vesical calculus was associated with two vesical diverticula.

Umbilical Fistulæ.—In a paper dealing with umbilical fistulæ, R. C. Begg[12] states that the urachus, in ordinary cases, does not, as is commonly stated, reach from the bladder to the umbilicus, but extends upwards for only one-third of this distance. It is attached to the posterior aspect of the navel by fibrous cords derived from the obliterated umbilical arteries. Its epithelial canal is never obliterated by fibrous tissue, although it may become impervious in parts owing to the accumulation of epithelial débris resulting from the proliferation of its own cells. Its lumen is in direct communication with that of the bladder in 33·3 per cent of cases. True *congenital fistulæ* in which urine is discharged from the umbilicus are of two varieties. The first includes cases in which urine flows freely, or perhaps exclusively, from the umbilicus. These are the result of complete non-development of the urachus, and the bladder reaches the umbilicus. Although such fistulæ are easily closed, they tend to re-open if backward pressure develops for any reason in later life. The second variety includes those cases in which the urine escapes drop by drop, and which are due to delay in closure of the ventral cloaca to form the urachus. When once these are cured, the bladder tends to descend naturally and the urachus develops, so that once closed there is no tendency for the fistula to re-open. A urachus which has once descended and assumed normal relations can never convey urine from the bladder to the umbilicus. *Acquired fistulæ* are of two types. In the first, owing to mal-development, there is no urachus and the bladder apex is at the umbilicus—a condition shown by reported cases to have been relatively commonly present. In the second type, urine escapes through the dilated terminal centimetre of the urachal canal or through a weak point at the junction of the urachus with the bladder. The peritoneum and transversalis fascia fuse at the level of the umbilicus and prevent the extravasated urine from passing upwards, so that it tends to escape at the weak point formed by the depression at the lowermost quadrant of the umbilicus. The main points to decide in cases of urinary discharge from the umbilicus are: whether the apex of the bladder itself reaches the umbilicus, and if so whether the upper segment is narrowed to form a canal representing a partially formed urachus; or whether the urine escapes from a normally placed bladder and reaches the umbilicus by means of a fistulous track between the peritoneum and the transversalis fascia. A careful study of each case by means of cystoscopy, and X-ray examination after the injection of opaque fluid such as sodium iodide into the bladder and fistula, affords the only exact method of diagnosis.

Calculus.—B. H. Hager and T. B. Magath[13] report five cases of urinary calculus in which the *Proteus ammoniæ* was isolated from the urine. These writers also report a series of experiments on rabbits and guinea-pigs carried out to show that calculi can be produced experimentally in the bladder by the introduction of the *Proteus ammoniæ* into the organ after the deliberate production of traumatic lesions of the mucous membrane. The writers discuss briefly the relationship between calculus formation and vitamin deficiency, and consider that "it is possible that deficiency of vitamin A is favourable to the implantation of *Proteus ammoniæ*".

References.—[1]*Surg. Gynecol. and Obst.* 1927, Oct., 502; [2]*Ann. of Surg.* 1928, March, 435; [3]*Deut. med. Woch.* 1927, May 20, 874; [4]*Surg Gynecol. and Obst.* 1927, Oct., 417; [5]*Brit. Jour. Surg.* 1927, Oct., 264; [6]*Surg. Gynecol. and Obst.* 1927. Dec., 820; [7]*Amer. Jour. Surg.* 1928, Feb., 113; [8]*New England Jour. Med.* 1928, March 8, 117, and *Jour. Amer. Med. Assoc.* 1928, i, 352; [9]*Jour. Amer. Med. Assoc.* 1928, i, 350; [10]*Surg. Gynecol. and Obst.* 1927, Nov., 629; [11]*Ann. of Surg.* 1928, May, 742, [12]*Surg. Gynecol. and Obst.* 1927, Aug., 165; [13]*Jour. Amer. Med. Assoc.* 1928, i, 266.

BLOOD DISEASES, HÆMORRHAGIC. (*See* Purpura.)

BLOOD GROUPS IN INFANTS AND CHILDREN.

Reginald Miller, M.D., F.R.C.P.

Elsie V. Crowe[1] has investigated the blood-grouping of children and infants, a subject on which our knowledge was none too exact. It has been stated, for instance, that an infant has no blood group, and that a baby's blood is compatible with that of its mother. Considering how often blood transfusion is now used in the treatment of melæna neonatorum and other conditions of infancy, it is very important to clinicians to know whether such statements are true. The author finds that they are untrue, and thus confirms the few

Blood Groups in Children and Infants.

Group	Author's Series		Moss	Culpepper
	100 Children	100 Infants	1600 Adults	5000 Adults
	Per Cent	Per Cent	Per Cent	Per Cent
I	6	1	10	3
II	39	36	40	38
III	9	6	7	18
IV	46	57	43	41

previous investigations made on the blood groups in infancy. She concludes, therefore, that it is unsafe to transfuse an infant with its mother's blood without making the usual tests for compatibility. Although infants have definite blood groups, it does not necessarily follow that the grouping remains constant during the first few months of life. Happ in 1920 showed that variation might occur up to the age of 2 years, when the grouping became fixed for the individual. The author's figures suggest the same conclusion.

After the age of infancy is passed, the proportionate blood-grouping in children is not greatly different from that of adults, as is seen in the table reproduced from the author's paper.

REFERENCE.—[1]*Arch. of Dis. in Childhood*, 1928, iii, 114.

BLOOD-PRESSURE, HIGH.

A. G. Gibson, M.D., F.R.C.P.

Ph. Pagniez and A. Escalier[1] have investigated the statement of Potain that the arterial pressure falls with *digestion* but rises if the amount taken is large or combined with much wine. They find that in normal subjects the first period of digestion is accompanied by a more or less marked lowering of pressure, and that this lowering of pressure may be seen when the meal consists largely of protein. The maximum fall occurs about one hour after the completion of the meal, it occurs in those with hypertension as well as normal subjects, and in the former the diminution of maximum pressure may be as much as 30 mm. of mercury. The authors therefore doubt the noxious action of meat in hypertension, and they remark that an important variation in the pressure readings may occur according to whether the patient is fasting or has recently had a meal.

S. G. Mudd and P. D. White[2] have analysed a series of cases which showed the *auscultatory gap*, the 'trou auscultatoire' of the French, in the investigation of the blood-pressure by the auscultatory method. As shown in the accompanying figure given by Mudd and White (*Fig.* 5), there are five types of normal sound heard over the artery during the fall of pressure from a point above the systolic pressure in the vessel. The first phase consists of sharp sounds probably due to the sudden distention of the collapsed artery caused by the return of the pulse wave. In the second phase there is a murmur superimposed. In the third phase the murmur disappears and the sounds become louder and more intense, produced by an increase in blood-flow. After reaching a maximum the sounds abruptly lose their character, and the fourth phase is one of feeble sounds gradually diminishing in intensity. The beginning of this phase marks the point of minimum pressure. The fifth phase is silence.

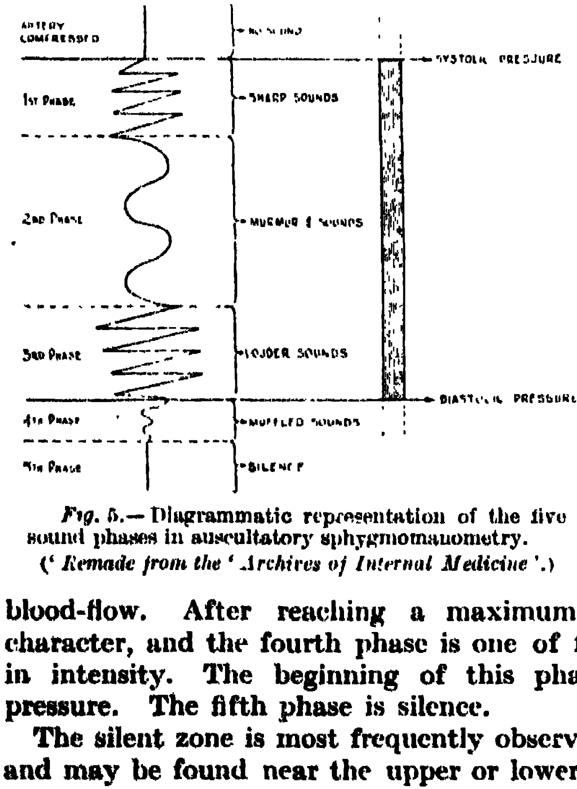

Fig. 5.—Diagrammatic representation of the five sound phases in auscultatory sphygmomanometry.
('*Remade from the 'Archives of Internal Medicine'.*)

The silent zone is most frequently observed in the second or murmur phase, and may be found near the upper or lower limit of the pulse pressure. This silent gap is found in a proportion of cases of hypertension and in aortic stenosis ; in the series here analysed it occurred in the average between 177 mm.

and 150 mm. Serious error may affect blood-pressure observation in those in whom it occurs unless the observer begins to listen at a point well above the upper limit of maximum blood-pressure, and again he may fail to register the proper minimal pressure if he fails to listen below the limits of the gap when the sound returns.

The phenomenon has some relation to the slow uprise of the pulse wave in aortic stenosis and to the anacrotic pulse in hypertension, both of which may indicate a reduced velocity.

N. M. Keith, H. P. Wagener, and J. W. Kernohan[3] have published a valuable account of *the syndrome of malignant hypertension*. Two of the authors had previously reported a series of cases of hypertensive retinitis with unimpaired renal function. The serious prognosis of the retinitis was there mentioned, for death occurred in from one to forty-four months. Their present paper concerns detailed observations in 81 cases. The disease may occur in childhood. The ages ranged from 9 to 64 years, but the majority were between 33 and 55. The onset of the symptoms was from 1 month to 6 years before being seen, and comprised headache and general weakness and nervousness. Five cases suggested tumour of the brain. Loss of weight was striking in 19 cases. Hypertension had been known to be present one to ten years previously. Dyspnœa on exertion occurred in 49. Urinary complaints were rare. Albumin in the urine was infrequent and not constant. Uræmic manifestations were rare, and the terminal coma was not always of that nature. Anæmia was not a prominent symptom. Cardiac enlargement was usually present, but in 16 it could not be demonstrated. Cardiac signs were accentuation of the second aortic sound, occasionally a systolic aortic murmur, in three an aortic diastolic murmur, and in one auricular fibrillation. Retinitis was present in all except one patient, in whom a mild retinitis observed at the first examination subsequently subsided. Abnormalities of vision were only present in 43 of the patients. This impairment would seem to be associated with the macular œdema, for with the recession of this œdema the scotoma disappeared. Bleeding, as epistaxis, petechiæ, uterine bleeding, and following tonsillectomy, was observed, but hæmorrhages generally were infrequent. Anæmia was associated with hæmorrhage, but was not otherwise present. None of the cases could be allocated to syphilis as an etiological factor. The electrocardiograph showed a significant inversion of the T wave in 34 cases, and in 30 of these death occurred within a year.

A number of renal tests were made on each case, and the conclusions were that in 21 cases the renal function was normal, in 46 insufficiency was mild, and in 7 each it was moderate and severe. The abnormalities of renal function would appear to be slight and usually secondary. This syndrome would seem in some cases to have been grafted upon benign hypertension without retinitis, which had been discovered within periods of 3, 5, and 7 years previously. The clinical groups of this hypertension fall into the three classical types: cerebral, cardiac, and renal. Seven of the cases which came to post-mortem all showed chronic diffuse nephritis. No form of treatment effected any permanent lowering of the blood-pressure. The minimal pressure was extremely difficult to alter. The authors look upon the type of retinitis rather than its severity as characteristic of this group of cases. The œdema of the discs is a most marked feature, and often disproportional to the other retinal changes. In the first stage there is hyperæmia and œdema in the disc and its surroundings, with a few superficial hæmorrhages and cotton-wool patches. In the second stage the œdema of the disc and retina becomes more marked and spreads into the macular region and the periphery. Hæmorrhages and cotton-wool exudates become more numerous and are found more peripherally. A few punctate exudates, always later than the cotton-wool patches, are seen. In the third stage the œdema recedes from the periphery, spots of pigment are seen, punctate exudates outnumber the cotton-wool patches, and are found in the star figure round the macula. The fourth stage is that of atrophy with pallor of the disc and vascular changes. The prognosis is extremely serious: 74 out of 81 patients died within 51 months, the majority within 2 years. Evidence of angina pectoris, intermittent claudication, and other peripheral arterial lesions, is uncommon.

B. S. Oppenheimer and A. M. Fishberg[4] have written an interesting paper on *hypertensive encephalopathy*, and have given a careful report of a case. This was a college student, age 19, who was admitted in an aphasic state following a convulsion. The history was that nine months previously he had had bronchopneumonia, which was followed after recovery by rheumatic fever. The systolic blood-pressure was then 120, and the urine did not contain any albumin. One month previously frontal headaches had appeared, arterial hypertension was found, and his urine contained albumin and blood. The headaches increased in severity until the convulsion. Examination afterwards showed a blood-pressure of 200 systolic, 110 diastolic, a leucocytosis of 28,000, a faint trace of albumin, and a few granular casts. Chemical examination of the blood did not reveal any abnormality of kidney function. For eighteen months he was under observation and had many convulsions, mostly bilateral, sometimes unilateral. There were other attacks without convulsion, but with a feeling of weakness and tingling in the right upper extremity, and again others with the same feelings in the left upper extremity. There was no biting of the tongue during the convulsions. Careful estimations of the blood-pressure showed that the highest readings were associated with the convulsive attacks. At no time was there any serious impairment of renal function, but there developed the typical picture of albuminuric retinitis with papillœdema and hæmorrhages. Considerable improvement occurred in the ocular condition, but a macular star remained.

The rest of the paper is devoted to a critical examination of this encephalopathy, which includes epileptiform convulsions, coma, headache, amaurosis, hemiplegia, and aphasia. The authors believe that these cerebral manifestations are not uræmic but consequent upon the hypertension, for the reason that, as in this case, there was no abnormality of renal function beyond slight albuminuria. They put this case into that group of vascular crises first adequately described by Pal in 1905, which includes the eclamptic seizures of pregnancy and the encephalopathy of lead poisoning. In both of these the kidney function is usually intact. The authors believe that the attack itself is due to vasoconstriction, for the reason that the brain has been found to be pale, and the retinal arteries have been observed to constrict during attacks of amaurosis and to return to their normal calibre at the end of the attack. They remark also on the extreme suddenness with which the cerebral phenomena come and go. They are unable to explain why encephalopathy complicates certain varieties of hypertension and is absent in others.

A. M. Fishberg[5] reviews the *arteriolar lesions of glomerulo-nephritis*, and adds some observations of his own in relation to his previous work on the arteriolar lesions following pure hypertension. The lesions were studied in a series of 37 cases. There are four types of lesion of the arterioles in diffuse glomerulo-nephritis: (1) Acute necrotizing arteritis, found in 3 out of 8 patients dying during the acute stage of diffuse glomerulo-nephritis; these lesions were probably of the same nature as the glomerular lesions. (2) Endarteritis obliterans was found in 17 out of 29 cases of chronic diffuse glomerulo-nephritis. It was not found, except in one instance, outside the kidney. This lesion is identical with that seen when an artery is tied, and is probably related to blockage when seen in the body. It is not found in the renal arteries in essential hypertension, because the arteriole is first thickened by arteriolosclerosis, with subsequent destruction of the glomerulus; while in glomerulo-nephritis the glomerulus is first injured and the arterial changes follow. (3) Arteriolosclerosis similar in histology and distribution to that found in hypertension. These changes are always present in the kidney. The splenic arterioles are affected in two-thirds of the cases, the hepatic in less than one-third, and the cerebral in one-fifth. (4) Muscular hypertrophy of the media of the renal arteries was marked in chronic glomerulo-nephritis. In essential hypertension the medial muscle is atrophied. Atrophy is also found in secondary contracted kidney of many years' duration, and there would appear to be a direct relation of hypertension to atrophy of the muscle.

A. H. Douthwaite[6] has made a clinical study of *hyperpiesia* in 43 cases. He finds dyspnœa on exertion to have been complained of in 24. Such dyspnœa is of greater frequency in the short florid person than in the sallow-complexioned hyperpietic. Blood-pressures of over 200 may be met with without the slightest dyspnœa on exertion. Headache was found in 19 cases, and was more frequent in the sallow type. It was invariable when retinal arteriosclerosis was observed. Fulminant headache or head pains are generally accompanied by a peak of high blood-pressure, which may be relieved completely within a few minutes by free bleeding. Some patients with headache complained of it when they stooped or coughed. There is no relation between headache and high diastolic pressure, and the author's impression is that it is associated with the underlying toxæmia. Giddiness was found in 10 patients, and is of serious import if there be nausea, retching, or headache at the same time. Such attacks may be followed by numbness or tingling in arm or leg. Nausea and vomiting seldom occur by themselves except with evidence of intracerebral bleeding. In two patients vomiting was a terminal event accompanied by increasing coma. Hæmorrhage occurred in six cases, either as small hæmorrhages in the skin or the retinal vessels, or from the nose. One case had hæmatemesis and melæna. Another, a woman age 36, had a copious uterine hæmorrhage. Nineteen out of the forty-three cases were of the thin, pale, and sallow type. The obese type in women may approximate to hypothyroidism. Indigestion was a common symptom, and one case recorded was of attacks of biliousness associated with a high pressure. Such cases are benefited by rest in bed and purgation by calomel. Mental symptoms, including loss of intellectual acuity, loss of memory for recent events, states of confusion, and emotional states are described. A case not included in the series is mentioned as having become maniacal during an attack of high blood-pressure. Another case became intensely drowsy, confused, and restless. Angina pectoris occurred in two cases, and one case is recorded as having sensations of choking and clutching at the throat after exertion. Visual disturbances are rare. Tinnitus occurred in nine cases, and general nervousness was common. As to the physical signs, there was no relationship between diastolic or systolic pressure and headache. It was noted that the diastolic pressure was less liable to fluctuation than the systolic. Albuminuric retinitis was not observed. Albuminuria was found in eight cases only, and in no case was there any deficiency of the kidney function. In five cases albumin appeared during the high systolic pressure period and appeared to be related to cardiac embarrassment. There was no polycythæmia in any case, and six showed slight secondary anæmia.

TREATMENT.—The author relies on **Restriction of Exercise and Work**, a limitation of **Diet**, and **Purgation**, especially by **Calomel**. **Nitrites** are not of value except for special symptoms such as angina or sometimes for severe headache. **Bromides** are of value in neurasthenia or restlessness. **Thyroid Extract** is used where a case resembles myxœdema. For some cases of persistent high blood-pressure the author has obtained considerable benefit by injections of **Veratrine**, $\frac{1}{12}$ gr., but its use has to be carefully controlled because it tends to produce violent retching and vomiting. It may also be given in repeated doses in the form of **Tinctura Veratri Viridis**, 10 min. It has great potency in reducing the blood-pressure, and with care might be used with considerable benefit.

REFERENCES.—[1]*Presse méd.* 1928, Jan. 4, 1; [2]*Arch. of Internal Med.* 1928, March, 249; [3]*Ibid.* Feb., 141; [4]*Ibid.* 264; [5]*Ibid.* 1927, July, 80; [6]*Guy's Hosp. Rep.* 1928, Jan., 59.

BLOOD-PRESSURE, LOW.

A. G. Gibson, M.D., F.R.C.P.

In 1925 Bradbury and Eggleston reported three cases of a new syndrome which they termed *postural hypotension.* D. G. Ghrist and G. E. Brown[1] have described two other cases. All have the following characteristics: (1) Syncopal attacks on change of posture accompanied by a considerable drop in blood-pressure; (2) An unchanging pulse-rate even with great changes in blood-pressure; (3) Lack of sweating and distress during the heat in the summer; (4) Diminished basal metabolic rate; and in Bradbury and Eggleston's cases increase of excretion of urine at night, apparent youthfulness of appearance, and secondary anæmia.

In Ghrist and Brown's first case, a man of 44 had begun nine years previously to have attacks of dizziness and hazy vision after rising in the morning. He could relieve these symptoms by lowering his head or lying down. If he were unable to do this he collapsed into true syncope for from 30 to 60 seconds, sometimes with much muscular twitching. Excitement or emotion precipitated the attack. Sexual power was lost. This was also seen in Bradbury and Eggleston's cases. Sweating had disappeared from the hands, face, and head. The patient was undernourished. There was no abnormal pigmentation, electrocardiograms were negative, and the Wassermann reaction was negative. There was a slight secondary anæmia. The blood-pressure was very variable, systolic from 120 to 90, diastolic from 92 to 60, and the low readings corresponded to the tendency to syncope. Experiments in the second case showed that the pressure was closely related to the posture, the low pressure being in the upright and the more normal in the recumbent. Symptoms of well-being were more associated with the recumbent posture. The disorder appears to have no relation to Addison's disease, and the peculiar symptoms, especially that of lack of sweating, would appear to put it into a special class. In the second case reported the patient received considerable benefit from **Ephedrine** given by the mouth at frequent intervals during the day. The first case had been somewhat upset by the first dose, and the treatment had not been continued by the patient.

REFERENCE.—[1]*Amer. Jour. Med. Sci.* 1928, March, 336.

BLOOD-VESSELS, SURGERY OF. (*See* ANEURYSM; VARICOSE VEINS; VASCULAR SURGERY.)

BOILS. (*See* SKIN, STAPHYLOCOCCAL INFECTIONS OF.)

BONE AND JOINT DEFORMITIES, CONGENITAL.

E. W. Hey Groves, M.S., F.R.C.S.

Congenital Absence of the Radius.—This deformity, which is usually associated with an absence of the thumb, is fortunately very rare. Various attempts have been made to replace the missing bone by some form of bone-graft, in order to prevent the hand from deviation towards the radial side, but hitherto it has been found impossible to place a graft as an independent bone unit amid the muscles of the forearm. Such a graft may live for a time, but it slowly becomes absorbed. F. H. Albee[1] has, however, succeeded in making a fairly efficient substitute for the radius by means of a graft which is attached at its upper end to the middle of the shaft of the ulna (*Figs.* 6, 7). By this means the wrist and hand are firmly held in a fork-like bone instead of being suspended at one side by the ulna.

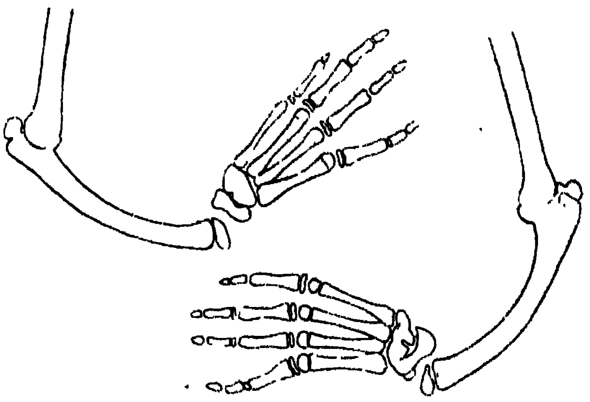

Fig. 6.—Drawing from a skiagram showing bilateral congenital absence of radius.

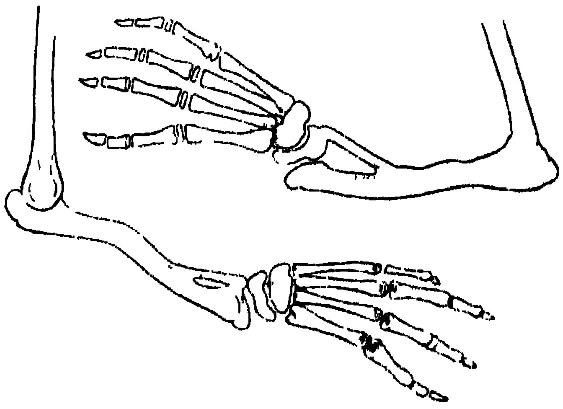

Fig. 7.—Same case several months after operation for formation of radius substitute.

(*Figs.* 6, 7 *re-drawn from skiagrams appearing in 'Annals of Surgery'.*)

Congenital Radio-ulnar Synostosis.—Cases of this somewhat rare deformity are described from time to time in the literature, and S. Ciaccia[2] has now given an account of a case together with a collection and review of other reports. The deformity is usually bilateral; thus, Leleu is quoted as having reported 141 cases, of which 85 were bilateral. The fusion of the two bones is always at their upper ends. The general growth and muscular development of the limb is unaffected, the only disability being the failure of the power of rotation of the hand. The latter usually lies in a position midway between pronation and supination. The most interesting consideration is that of treatment. A large number of cases have now been subjected to operation. The operation consists in a division of the synostosis or of the neck of the radius with the intervention of a flap of muscle or fascia. The results of these operations, however, have been disappointing. Very little movement has been obtained, and even this benefit is usually transitory. Probably, therefore, it would be wise to refrain from any operative treatment, or else to limit it to those cases—very rare ones—where the hand lies more supinated than pronated. In these cases the operation should be confined to a simple **Osteotomy** of the neck of the radius, the hand being then put up in full pronation.

Congenital Pseudarthrosis of the Tibia.—Fortunately congenital fractures are as rare in their occurrence as they are mysterious in their origin. The commonest of them is that affecting the tibia. The condition is associated with a very slender and fragile structure of the tibia and fibula, both of which are usually fractured towards the lower third of the leg. As might be expected from the very ill-formed atrophic character of the bone, it is exceedingly difficult to induce repair. M. S. Henderson[3] has described seven cases, of which five were operated upon, with successful results in only two. The condition is almost certainly one of local atrophy and not of constitutional disturbance. The bones having been fractured in utero, the leg becomes useless. The skeleton does not act as a strut nor does it afford efficient attachment to the surrounding muscles ; hence the loss of function leads to atrophy. There is no evidence of any metabolic disturbance affecting either the calcium or the phosphorus in the system. It is useless to attempt any operative procedure until the child's general health and vigour are well established, or until it is sufficiently old to present bones of a certain size. Henderson recommends waiting until the child is 6 years of age. The operation which is then done must be some form of **Bone-grafting.** The bone-ends are exposed and refreshed so as to give good contact, joined together by pegs or bone screws, and the region of the join is surrounded by bone-chips obtained by scraping out the marrow cavity or by an osteoperiosteal flap. An alternative method of grafting is by taking a massive graft and applying it along the whole length of the tibia. The practical difficulty of this latter procedure consists in obtaining a sufficiently massive graft from any other bone of the small patient. [The reviewer suggests that it would be well worth trying the use of a homoplastic living graft taken from the mother. In this way it would be possible to obtain a bone-graft long enough to extend from one epiphysial line of the tibia to the other.—E. W. H. G.]

REFERENCES.—[1]*Ann. of Surg.* 1928, Jan., 105 ; [2]*La Chir. d. Org. d. Movimento,* 1927, Aug., 513 ; [3]*Jour. Bone and Joint Surg.* 1928, July, 483.

BRAIN, TUMOURS OF. (*See also* CISTERN PUNCTURE.)

Geoffrey Jefferson, M.S., F.R.C.S.

AIDS TO DIAGNOSIS.

The accurate diagnosis of brain tumours is so difficult for those without a very special knowledge, that it is not surprising that all manner of different aids should have been developed. Even amongst neurologists themselves skill in localizing tumours is not equally divided, but they unite in general in criticism of the non-neurological methods of diagnosis which the past decade has seen elaborated. The problem is not, of course, as to whether a tumour is present—we are, it is to be hoped, long past that stage—but as to where the tumour is, what is its nature, and what the best method of attack. It is only fair to remark that if clinical methods of diagnosis had been as perfect as some neurologists are apt to hold, these other helps would never have been felt to be necessary, and would never have been elaborated. In other words, were there no demand there would have been no supply. However, at this date none but the most obstinate will deny that there are times when the ordinary methods fail. The neurologists of this country have held that these times are few, and the percentage number is very small in which a good localization is impossible. With this contention the present writer agrees, and there can be no doubt whatever that in some other countries the tendency to appeal to 'workshop' methods of diagnosis too soon has been carried, and is still being carried, to an extreme. There are those who pay little attention to the history and clinical signs, and pin their diagnostic faith firmly to the X-ray pictures obtained after air injection either into the ventricles or into the lumbar sac. Some others, faced with cases in which the diagnosis is sufficiently obvious, none the less proceed to make ventriculograms. The reader will find many cases reported in which it is perfectly clear, from the few lines of print describing the general features of the case, just where the tumour was, and yet various operative diagnostic procedures were carried out. To what end ? One sees here only another example of that strange fascination which new methods of diagnosis have for many of us, causing us to apply them to the solution of problems the answer to which is already known to us, in the hope, presumably, that we may be better fitted to apply the new test to more obscure cases in the future.

Ventriculography and Encephalography.—These two methods are now so well known that there is little to say about them except that the literature of the subject is steadily growing. *Ventriculography*—the replacement of cerebrospinal fluid by air after direct puncture of the ventricle—is now a soundly established diagnostic means. Bilateral punctures are now the rule. Everyone is aware of its dangers, and few surgeons experienced in neurological surgery use it much. It is being replaced by 'ventricular estimation' (*see below*). A particularly careful piece of work on the radiological appearances of the third ventricle has come from the Argentine, a study by M. Balado, R. Morea, and C. Donovan.[1] There is no question that, whatever harm has been done by the too enthusiastic use of ventriculography, we have on the credit side learned a very great deal about the ventricular system and the mechanical upset of cerebrospinal fluid circulation—an aspect of the cerebral tumour problem which had been unaccountably overlooked before.

Encephalography—lumbar insufflation of air in place of cerebrospinal fluid withdrawn—finds its adherents. R, W. Waggoner, of Philadelphia,[2] describes ten cases in which he has used it. An important step in advance is the control of the air injections by a manometer connected to the injection syringe by a three-way tap, so that the initial pressure reading need never be exceeded. The lumbar route is more dangerous than the ventricular; there can be no doubt on that point. Everyone is aware of the risks of lumbar puncture in cerebral tumour cases, and air injection increases them. But it is a better method than the other for difficult cases in which the intracranial pressure is not raised (porencephaly, degenerations, and so forth), though here the information that one gains is, perhaps, hardly worth the having, as nothing can be done to improve the cerebral state. The patients suffer a good deal of headache and are sometimes very ill for a few hours after lumbar air insufflation, but fatalities are rare, except in tumour-bearers. J. A. Sicard and J. Haguenau[3] find that some of these troubles can be overcome by placing the patient in the Trendelenburg posture after the films have been taken, when the air ascends into the lumbar theca and can be withdrawn.

Intracerebral Lipiodol.—Sicard and Haguenau have been experimenting with lipiodol placed in the ventricles, but admit that it is of little or no use, as the mass is too small and will not run out of one ventricle into the other. 'Lipiodol ascendant', an 11 per cent solution of iodine in poppy-seed oil (the more familiar heavy solution contains 54 per cent) gives better pictures; in fact, Sicard thinks it gives the best pictures of any if it is emulsified in a quantity of cerebrospinal fluid, but he warns us against using it in its present form. The same authority has been injecting lipiodol into the carotid artery and into the superior longitudinal sinus, but, so far as the reviewer can judge, without gain.

Arterial Encephalography.—Egas Moniz,[4] of Lisbon, has just published a series of papers on the intracarotid injection of 6 to 8 c.c. of a 25 per cent solution of **Sodium Iodide.** The object is to obtain a picture of the cerebral arterial tree by instantaneous X-ray exposure at the time of the injection. The idea underlying the method is that vessels will be pushed aside by brain tumour, and a relatively avascular patch means that the lesion is occupying that place. The carotid must be exposed in the neck, and the external temporarily occluded to prevent pictorial error. Moreover, Moniz remarks that if the iodide is allowed to run into the lingual artery, a spitting reflex immediately appears, and this may spoil the result. We scarcely think that many will be tempted to follow Moniz's example, for not only is the technique tricky without being in any way difficult, but the results must be difficult to interpret. The puncture of the carotid artery with a Record needle is a perfectly harmless procedure, for its muscular and elastic wall seals the track immediately, so that no leak or aneurysm follows a clean puncture. Some persons, notably in Germany, have for long used the intracarotid path for injecting antisyphilitic remedies in neurosyphilis. Repeated punctures in the same person through the intact skin have done no harm.

Examination of Cerebrospinal Fluid.—

Lumbar Puncture.—Although there is some danger in performing a lumbar puncture in cases of brain tumour, the information obtained can be of considerable service at times, provided that pains are taken to extract the utmost information possible. Often enough the only point recorded in the hospital notes of tumour patients is that the fluid was clear and under moderate tension, the latter point being estimated purely on the gross character of the outflow from the needle. It will later, in most cases, be added that cells were few in number and that the Wassermann reaction was negative. J. B. Ayer[5] has recorded the results of analysis in sixty-seven cases of brain tumour. At the Massachusetts General Hospital it is the rule not to do a lumbar puncture in cases which present a high grade of choked disc. In such cases a combined ventriculo-lumbar puncture is performed.

Pressure.—The reading is made with a plain glass manometer of 2-mm. bore. Fluid pressures higher than 25 cm. of water are regarded as abnormally high, though these may be given by patients with hyperpiesia and uræmia. Of 61 cases in which a pressure reading was taken, 42 were above 25 cm. The cerebrospinal-fluid pressure appears to go hand in hand with changes in the optic nerve-head, though sometimes a low reading was found in cases with characteristic papillœdema (6 cases), and vice versa (3 cases). The correct diagnosis is not likely to be missed, as one or other of the two tests is certain to be correct.

Colour.—Of 54 cases, the fluid was clear in 41 and yellow in 13. An interesting point is that subtentorial tumours give a large yield of yellow fluids, especially the acoustic neuromas.

Protein.—With sulphosalicylic acid the upper limit of the normal total protein is 40 mgrm. per 100 c.c. of fluid. Seventy-three per cent of Ayer's cases showed an excess of protein in the lumbar fluid. The acoustic neuromas give the highest readings, though supratentorial tumours can show increased protein at times.

The colloidal gold curve, cell count, and sugar determination did not give any help. One may summarize by saying: if the fluid pressure is above 30 cm., has twice the normal amount of total protein, without pleocytosis, the evidence is strongly in favour of tumour.

Ventricular Estimation.—By this term we have come lately to refer to puncture of the lateral ventricles made with a view to establishing the presence and situation, particularly the latter, of an intracranial tumour. The method has arisen out of the more extensive use of Dandy's ventriculography, but it probably originates with Cushing and others who have done it for years, though not perhaps with such deliberation as has now been achieved. Cushing certainly used it to find out, in a difficult case, whether the ventricles were dilated or not. If they were, the tumour lay, in all probability, in the posterior fossa, though some tumours of the third ventricle and some suprapituitary tumours will cause obstructive hydrocephalus. The information must of course fit in with the neurological signs which have been elicited,

F. C. Grant[6] gives his experiences. Before one can make the fullest possible use of ventricular estimation, one must appreciate fully the effects of tumour in various situations upon the ventricular pattern. The operator must also be familiar with the technique, and the position and depth at which he will normally withdraw the fluid. The ventricles must uniformly be tapped from the same place. The technique usually adopted is to place the patient prone and bore a hole 1·5 to 2 cm. on either side of the mid-line and 7 cm. above the external occipital protuberance. The fine blunt-ended brain cannula will enter the ventricle at a depth of 4 to 5 cm., the plane of tapping being forwards and slightly outwards, level with the top of the ear. It is held that 30 c.c. of fluid should be easily obtained before one can safely diagnose the presence of hydrocephalus. Indigocarmine can be injected into one ventricle, and if obtained from the other, one knows that the foramina of Monro are patent. Sometimes much more fluid can be obtained from one ventricle than from the other, and this, indeed, may be impossible to locate. One then knows that the tumour lies on the side from which little or no fluid has been obtained.

A further variation is to perform a lumbar puncture, and compare the readings of two manometers, one attached to the ventricular cannula, the other to the lumbar needle. This was first followed up by Freemont-Smith and J. S. Hodgson,[7] the latter of whom now gives further data thus obtained. By compressing the jugular veins a rise of pressure occurs in the skull and causes the ventricular fluid to rise in the glass tube. If no rise occurs simultaneously in the lumbar region, one knows that the tumour is blocking the fluid pathway. Hodgson states that in infratentorial tumours a block was present in two-thirds of his cases, whilst it was present in only one of twenty-five supratentorial tumours (a pinealoma, which would naturally obstruct the aqueduct). He has noted, as has Ayer, that the protein is increased in a number of subtentorial lesions, but he makes this addition to Ayer's work, that the lumbar protein is not increased in supratentorial tumours unless the protein in the ventricular fluid is increased. In these cases presumably the tumour is lying close under the ventricular lining.

W. Sharpe[8] seems to prefer the *cistern puncture*, the dangers of which, in tumour cases, are referred to elsewhere (*see* CISTERN PUNCTURE).

REFERENCES.—[1]*Arch. Argent. de Neurol.* 1927, Nov., 237; [2]*Amer. Jour. Med. Sci.* 1927, Oct., 459; [3]*Presse méd.* 1928, Feb. 4, 145; [4]*Ibid.* June, 689; [5]*Jour. Amer. Med. Assoc.* 1928, May 12, 1521; [6]*Surg. Gynecol. and Obst.* 1928, May, 689; [7]*Jour. Amer. Med. Assoc.* 1928, May 12, 1524; [8]*Ann. of Surg.* 1928, Jan., 1.

BRAIN, VASCULAR LESIONS OF.

Sir James Purves-Stewart, K.C.M.G., C.B., F.R.C.P.

Cerebral Embolism following Thrombosis of the Subclavian Artery.—The commonest cause of an embolus in the systemic circulation is the detachment of a portion of a pre-existing thrombus, either from one of the valves, aortic or mitral, in the left side of the heart, or from the left auricular appendix. The resulting embolus may lodge in any of the systemic arteries, producing a corresponding area of infarction. In the pulmonary circulation, on the other hand, the primary thrombus is formed in one of the systemic veins, and the resulting embolus, travelling centripetally to the right side of the heart, ultimately lodges in the lung, constituting a pulmonary infarct. Cerebral embolism, then, is commonly a result of a left-sided heart lesion. But in rare cases, as has recently been demonstrated, it may arise in the presence of a perfectly healthy heart, when a primary thrombus occurs near the origin of the vertebral or the common carotid artery. One method in which this accident may arise is when the arteries at the root of the neck are compressed by bony abnormalities, especially by a cervical rib or by an ununited fracture of the clavicle.

A. G. Yates and D. Guest,[1] of Sheffield, have recorded an instructive example in a woman of 41, a chronic epileptic, who had fractured her clavicle unwittingly during a fit and in whom the fracture remained ununited. She presented herself at hospital with the right hand cold and blue, and with no pulse to be felt anywhere in the limb. The old ununited fracture of the right clavicle was recognized, together with the presence of thrombosis of the subclavian artery. The risk of the thrombus extending proximally to the junction with the right common carotid artery was pointed out, and the patient was recommended for admission. Before arrangements to this effect could be completed, the patient had a sudden attack of cerebral embolism, ushered in by headache, vomiting, and visual impairment. She then became unconscious, with left-sided hemiplegia. The temperature rose to 105° F. and she died seven days after the onset. At the autopsy an old ununited fracture of the right clavicle was demonstrated at the junction of its middle and outer thirds, with fibrous union and the formation of a false joint. The free ends were smooth and displaced slightly downwards towards the right subclavian artery. An organized thrombus about 1½ in. long was found occupying the first and second parts of the right subclavian artery. In the brain a recent embolus was found in the basilar artery at its point of division into terminal branches, and areas of softening were found in the upper and middle levels of the pons and in the crura cerebri. The sequence of events in this case was clear. It was evident that a portion of the thrombus in the right subclavian artery had become detached and swept up into the vertebral artery.

This case is analogous to two clinical cases of cervical rib reported by C. P. Symonds[2] which were also associated with hemiplegic symptoms. Although rare, such cases are easily recognized, and the clinical lesson to be drawn is the importance of immediate surgical intervention in cases of subclavian compression secondary to cervical rib or to fracture of the clavicle, in the hope of preventing a cerebral catastrophe.

Cerebral Hæmorrhage : Differential Diagnosis.—It is sometimes a matter of difficulty to decide whether a patient with recent acute hemiplegia is suffering from cerebral hæmorrhage or cerebral thrombosis. The third alternative, that of cerebral embolism, apart from its suddenness of onset, can usually be decided by the presence or absence of a mitral or aortic lesion which could give rise to an embolus. In deciding between cerebral hæmorrhage and cerebral thrombosis there is no single diagnostic point which by itself can be considered conclusive. Important points, however, are afforded by a consideration of the patient's age, the condition of his blood-vessels and especially the blood-pressure, the mode of onset and development of the attack, the distribution and progress of the paralysis, the presence of stupor or coma, the existence of syphilis, renal disease, a history of previous attacks, and so on. It is obvious, moreover, that the treatment of an attack of hæmorrhage must differ essentially from that of thrombosis. Where we are in doubt as to which of the two is present, we avoid the blood-letting and depressant measures suitable for hæmorrhage on the one hand, and the stimulant remedies appropriate to cerebral thrombosis on the other, and content ourselves with what is euphemistically termed expectant treatment.

In view of the foregoing difficulties, J. Wilder,[3] of Vienna, has directed attention to the value of examination of the blood serum for the presence of excess of bilirubin by van den Bergh's method. The essential procedures in van den Bergh's test are, firstly, the removal of albumin from the blood serum by means of alcohol ; the alcohol at the same time extracts the bilirubin, which is demonstrated by yielding a colour reaction with a diazo reagent, the intensity of the colour being compared with that of a standard solution of rhodan iron. Normal blood serum, examined by this test, shows a certain small proportion of bilirubin not exceeding from 1–1,000,000 to 1–335,000, according to van den Bergh's own figures. Examination of the urine for bilirubin cannot replace examination of the blood serum, since bilirubin in the serum after a hæmorrhage appears much earlier, and disappears much later, than in the urine.

The value of van den Bergh's test, however, is restricted by the fact that excessive amounts of bilirubin appear in the blood serum in numerous conditions such as the following: (1) Diseases of the liver and gall-bladder, including all forms of hepatogenous jaundice; (2) All forms of hæmolytic jaundice, including severe anæmias, especially in malaria; (3) Family acholuric jaundice; (4) All severe internal hæmorrhages, e.g., post-operative, intestinal, extra-uterine pregnancy, abortions, etc.; (5) Pregnancy with pressure on the liver; (6) Lobar and lobular pneumonia; (7) Hæmorrhagic infarcts, e.g. from ulcerative endocarditis; (8) Nutmeg or congested liver from backward pressure in failure of cardiac compensation; (9) Icterus of the new-born; (10) Hæmaturia and hæmoglobinuria; (11) After a blood-transfusion; (12) In certain blood poisons. It is therefore not surprising, since every internal hæmorrhage of any size, causing absorption of blood pigment, tends to produce a hæmolytic jaundice which can be recognized by the van den Bergh test, that we should expect the proportion of bilirubin in the blood serum in cerebral hæmorrhage to be higher than in cases of cerebral thrombosis. Wilder's observations support this view. In his series of 13 cases of cerebral hemiplegia verified by autopsy, the results were as follows: -

Seven cases were due to hæmorrhage, and in 6 of these the proportion of bilirubin in the blood serum was definitely increased, varying from 1–167,000 to 1-95,000; the 7th case was a small hæmorrhage, the size of a cherry, which had ruptured into the lateral ventricle, and in which only traces of bilirubin were detected in the blood. On the other hand, in 3 cases of cerebral thrombosis the proportion of bilirubin was definitely low—1-235,000, 1–800,000, and 1–400,000. One case of thrombosis plus tumour showed a proportion of 1–170,000, whilst a case of cerebral tumour without hæmorrhage or softening, dying the day after a hemiplegic attack, yielded 1-265,000. The 13th case was one of multiple softenings, examined several weeks after the last attack, which yielded the high figure of 1–74,000. This last patient, however, developed acute biliary colic, and at the autopsy the liver was enlarged, yellowish-grey in colour, and friable.

As controls, Wilder records five other cases as follows: (1) Meningeal hæmorrhage. When examined seven days after the attack, the bilirubin content was increased (1–167,000), but on the twelfth day, when convalescent, it had fallen to normal limits (1–200,000). (2) Cerebral abscess. On the day following an extensive cranial operation with consequent hæmatoma, the bilirubin was increased to 1–102,000. (3) Cerebral tumour, one day after a severe apoplectic attack with blood-stained cerebrospinal fluid. The bilirubin content was increased to 1–160,000. (4) Hæmorrhage into a cerebral glioma. The bilirubin content was raised to 1–160,000. Eight days later, after air-filling of the ventricles there was prolonged stupor, probably due to intercurrent hæmorrhage, and the proportion of bilirubin rose next day to 1–114,000, but fell six days later to the normal figure of 1–200,000. (5) A doubtful case, probably of cerebral embolism from heart disease, with blood-stained cerebrospinal fluid. Here the proportion of bilirubin was 1–265,000, which was within normal limits, whereas a few days earlier it had been as high as 1–100,000.

He also quotes a series of 6 cases diagnosed clinically as hæmorrhage but which did not come to autopsy. In all of these, examined at periods varying from one to thirty-five days after the attack, the bilirubin content was increased, varying from 1–200,000 up to 1–102,000. On the other hand, in a series of 25 cases diagnosed clinically as softenings, the proportion of bilirubin was normal or subnormal, varying from 1–200,000 down to 1–800,000. Similar normal or subnormal figures were obtained in a series of cerebral cases including three of cerebral tumour, two of brain abscess, and one each of angiospasm, gumma, and multiple sclerosis. Normal figures were also shown by cases of hysterical hemiplegia, arteriosclerosis with slight asymmetry of reflexes, paralysis agitans, polyneuritis, hysteria, and two cases of psychogenic tic.

Wilder's researches are still incomplete. Thus, for example, he has not yet determined within how many hours after a cerebral hæmorrhage the excess of bilirubin in the blood appears, nor how long the excess lasts. Perhaps this depends partly on the size of the hæmorrhage. The foregoing observations, however, indicate that in the van den Bergh test we have a useful method of deciding with a considerable degree of probability whether an apoplexy is due to hæmorrhage or not. A bilirubin-content which exceeds 1–200,000 is in favour of a diagnosis of hæmorrhage. This increase has been demonstrated within twenty-four hours after the attack and has been present as late as four weeks afterwards.

REFERENCES.—[1]*Lancet*, 1928, ii, 225: [2]*Brain*, 1927, June, 259; [3]*Wien. klin. Woch.* 1927, Sept., 8, 1158.

BRANCHIAL CYST.

Sir W. I. de C. Wheeler, F.R.C.S.I.

Hamilton Bailey,[1] in a paper on the diagnosis of branchial cyst, says that it is common to find a branchial cyst mistaken for breaking-down tuberculous cervical glands. Eleven cases have come under his observation where this error had been made, and in not a few of these treatment for tuberculosis had been persisted in.

Branchial fluid, on being aspirated, looks just like tuberculous pus, a coincidence which, combined with an implicit trust in the bacteriological report, is the fundamental basis of this confusion.

"No tubercle bacilli found; cultures sterile." We have rightly come to look upon this familiar report as confirmatory evidence of tubercle. But it should be borne in mind that branchial fluid is also often sterile.

In about 10 per cent of cases tubercle bacilli are found in tuberculous pus. In such cases it would appear ridiculous to suggest the possibility of an alternative diagnosis. The following exceptional case proves the contrary. A branchial cyst was removed by operation, and its wall, subjected to histological examination, revealed stratified squamous epithelium upon a basis of lymphoid tissue. The fluid aspirated before operation, and the contents of the specimen after operation, showed numerous tubercle bacilli. Doubtless organisms can penetrate the epithelial envelope from its ensheathing lymphoid covering, which in turn is connected up with the cervical lymphatic system.

Breaking-down tuberculous glands are exceedingly common; branchial cyst is comparatively rare. The difficulties which surround the diagnosis of the latter are admittedly formidable, but they are by no means insurmountable.

Clinical Features.—Branchial cyst usually makes its first appearance in early adult life. The onset is often curiously abrupt, after which the cyst begins slowly to increase in size. Recurrent attacks of inflammation in the cyst are usual.

Branchial cyst is nearly always related to the upper third of the sternomastoid (*Plate X, A*). It is usually found coming from the deeper planes

PLATE X

BRANCHIAL CYST

(HAMILTON BAILEY)

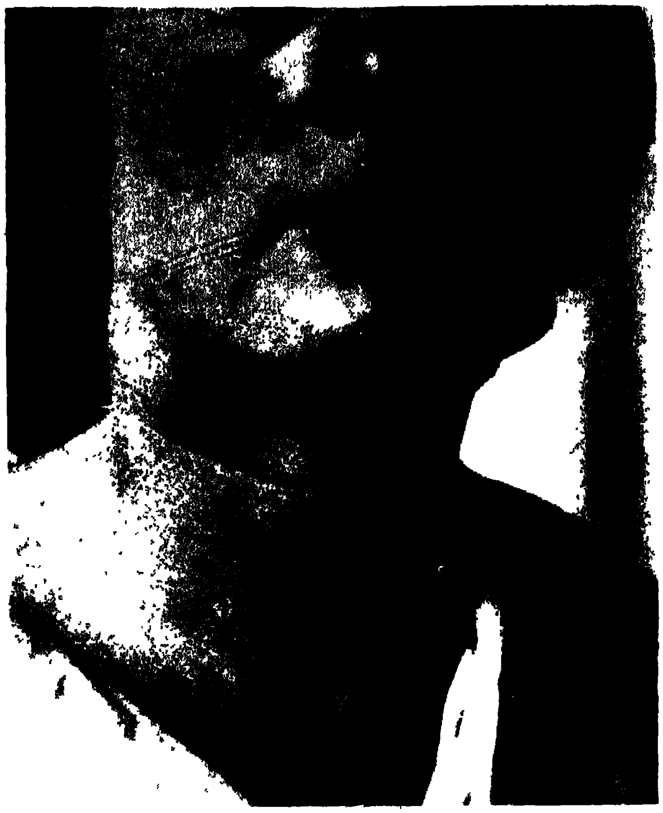

Fig. A.—Typical branchial cyst. Note relationship to upper third of sternomastoid.

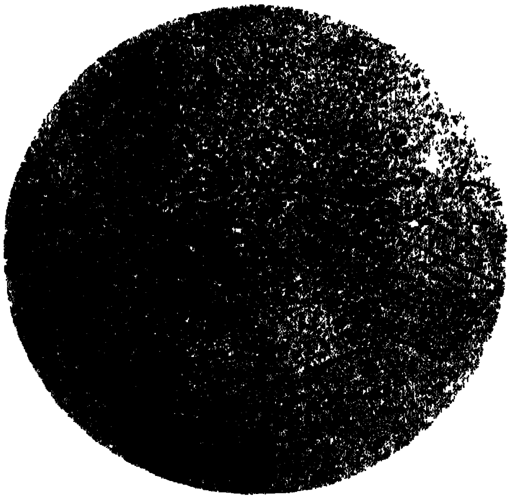

Fig. B.—Photomicrograph of branchial fluid. The abundance of cholesterol crystals is characteristic.

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of the neck around the anterior border of this muscle. But as the sterno-mastoid is thinned and flattened over the cyst, this relationship is seldom clear until the muscle has been rendered taut.

If a swelling answering to the above description is found, the absence of enlargement of the cervical glands when the neck is systematically palpated should raise in the examiner's mind the question, "Is this a branchial cyst?"

Confirmatory Test for Branchial Cyst.—After the skin has been sterilized, a little of the fluid is aspirated. It will usually run quite easily through the needle of an ordinary hypodermic syringe. A drop of the aspirated fluid is placed upon a slide and covered with a cover-slip. The slide is then examined under the microscope with a one-sixth power lens. The presence of numerous cholesterol crystals at once makes the diagnosis certain. *Plate X. B*, is a photomicrograph of a drop of fluid removed from a branchial cyst for the purpose of confirming the diagnosis.

REFERENCE.—[1]*Brit. Med. Jour.* 1928, i, 940.

BREAST, CANCER OF.

Sir W. I. de C. Wheeler, F.R.C.S.I.

The reviewer has recently removed the breast in the case of cancer in a patient on whom he performed a radical operation for cancer of the other breast some years previously. It must be remembered that, although cancer in any organ of the body probably produces some immunity against further growth, it is not uncommon, especially in the breast, to find independent malignant growths either arising simultaneously in the other breast or appearing after a varied interval. Such independent growths must not be mistaken for recurrence.

In another case the diagnosis of an early scirrhus was made and the radical operation performed. When the breast was incised the lump was found to be a solitary cyst. It is often very difficult to tell whether the tumour is a solitary cyst deep in the breast tissue or commencing carcinoma. Sometimes the differential diagnosis between innocent and malignant tumours is quite impossible. In two cases which reported recently for examination the arm had become œdematous after an interval of years. This gives rise to a natural anxiety lest the œdema be due to an intrathoracic recurrence, but it must be remembered that lymph stasis is the natural result of very wide removal of the axillary glands, and that œdema may be determined later by the contraction of scar tissue following wide dissection.

The Origin of Bone Deposits in Breast Cancer.—In 1904 Handley studied bone metastases in 73 of 329 cases of cancer of the breast which came to autopsy. He concluded that bone metastasis occurs chiefly along the deep fasciæ beneath the skin, and by lymphatic permeation rather than by blood embolism. He now[1] agrees with Carnett that chains of infected glands can often be traced through the diaphragm along the aorta and its branches to the groin, and that retrograde permeation of the trunk lymphatics is a more rapid process than permeation of the small lymphatics of the fascial plexus. The femur is reached by the intra-abdominal extension, and the humerus by permeation along the tributaries of the axillary glands. Handley is still of the opinion, however, that occasionally cancer cells may reach the humerus by the fascial route. The freedom from metastasis of distal bones is only relative, as in late cases deposits can be recognized below the elbow and knee.

W. C. White[2] deals with *the results of operation* in cancer of the breast, and comes to the following conclusions :—

The removal of the pectoralis minor does not seem to be an essential part of the operation. While the removal of the fascia over the upper part of the recti is desirable, it is not an important part of the procedure.

A wide excision of the skin is not necessary, but, on the other hand, an effort to avoid skin grafting at the risk of skin recurrence is poor judgement. A wide skin excision can be partly avoided by the careful subcutaneous fat dissection.

Definite metastases in the supraclavicular region are a contra-indication to operation, as is also large extension to the axilla. A palliative operation may be justified for the mental effect on the patient, but not from the point of view of increasing length of life. It may also be worth while to prevent the annoyance of a sloughing ulcer.

It is fair to believe that, of all operable cases, 30 to 35 per cent are free from recurrence at the end of five years. If we take only the cases that are free from axillary metastases, 60 to 65 per cent are free from recurrence at the end of five years.

His ten-year group of 61 cases indicates that 24 per cent are free from recurrence at the end of ten years. Of the cases free from axillary metastases about 50 per cent may expect to be free from recurrence.

A study of the cancer cell in relation to its adenomatous formation, secretion, size variation, nuclear changes, and hyperchromatosis gives one a clue as to the relative malignancy of the particular cancer of the breast investigated. It is not as certain as the help derived from a study of epithelioma of the lip.

He does not believe radiation before operation is proved of value. Radiation after operation has not lowered the mortality in the second half of his ten-year group. Nevertheless he has not abandoned the belief that it may do some good, and for the present continues to advise its use after operation.

H. Holfelder[3] discusses the question of the *justifiability of giving post-operative irradiation* in carcinoma of the breast. He says that purely surgical results in breast carcinoma cannot exceed a certain optimum, and are not sufficiently good to warrant satisfaction with surgical treatment alone. Prophylactic measures may be dispensed with only in early cases. Prophylactic röntgen treatment may cause injury if the effect of the rays is too strong.

The results of operation are unsatisfactory, and will probably remain so with the present technique because the regional lymph glands are only partially accessible to operation. The lymph glands in the axilla must be removed by careful anatomical dissection following sacrifice of the pectoralis major muscle. Even the removal of the supraclavicular glands makes the operation much more extensive and difficult. Removal of the lymph glands in the region of the internal mammary artery, which are involved early when the primary tumour is situated in the inner quadrant of the breast, is practically always impossible. Weinert, using the Spalteholz method of making frontal sections through the removed breast, has shown how far the cancer nests may extend from the primary tumour, and therefore how seldom an operation is truly radical. The necessity for the improvement of surgical results by prophylactic measures to prevent recurrence is therefore evident. Of chief importance, however, is the manner in which the irradiation is given.

While the direct effect of the röntgen rays on carcinoma cells is incontestable, it appears improbable that all of the cells of a cancer are destroyed simultaneously by any one dose such as the so-called carcinoma dose. If the resistance of the body is still sufficiently great, active carcinoma cells may be destroyed in this manner together with cancer cells left behind and already damaged, but in other cases even the most intensive irradiation may fail to cause healing.

The difference in the length of the latent period between operation and the first sign of a recurrence may be explained only by the assumption that early recurrence is caused by active carcinoma cells which were left behind, while later recurrences are produced by carcinoma cells which remained inactive in the tissues for many years without any metabolism of their own until, for some unknown reason, they began to grow.

According to clinical experience, the latter type of carcinoma cell is far less sensitive to the röntgen rays than the fully active carcinoma cell, but because of the inactivity of their metabolism, the resting cells are unable to recover from the effects of the irradiation. Therefore it may be assumed that numerous small röntgen doses given at proper intervals may eventually damage this type of cell. The results at the Kiel Clinic are best explained in this way.

Truly successful irradiation treatment renders local recurrence a rare exception, and is limited only by cases in which death results from metastases. The formation of distant metastases is prevented most surely by pre-operative prophylactic X-ray treatment, since it is assumed that a spread of the carcinoma cells occurs either before operation or is favoured by operation. Post-operative prophylactic irradiation is given primarily to prevent local recurrence.

(*See also* RADIUM AND X-RAY THERAPY—CANCER OF THE BREAST.)

REFERENCES.—[1]*Surg. Clin. N. Amer.* 1927, vii, 1 (abstr. *Surg. Gynecol. and Obst.* 1927, Aug., 137); [2]*Ann. of Surg.* 1927, Nov., 695; [3]*Strahlentherapie*, 1926, xxii, 667 (abstr. *Surg. Gynecol. and Obst.* 1927, July, 19).

BRIGHT'S DISEASE. (*See* RENAL DISEASE.)

BRONCHIECTASIS. (*See* CHEST, SURGERY OF.)

BRONCHITIS, CHRONIC.

W. H. Wynn, M.D., F.R.C.P.

The diagnosis of chronic bronchitis is frequently made, but it is doubtful how far this is justified. As a primary condition, or even as a sequel to repeated attacks of acute bronchitis, it appears to be distinctly uncommon. Closer scrutiny of the cases would show that a more correct diagnosis would in many cases be fibrosis of the lung, dilatation of bronchi, chronic nasopharyngeal catarrh, or even tuberculosis, and there is a striking contrast between the abundance of literature on these subjects and the paucity of that on chronic bronchitis.

If the differentiation of bronchitis is uncertain, the same is also true of its treatment, and there is no department of therapeutics which has advanced so little as that concerned with expectorants. J. A. Gunn,[1] in a paper on the action of **Expectorants,** points out that there is a double mechanism for protecting the air-passages—motor and secretory. The motor mechanism consists of (1) the propulsive movement of cilia, (2) the co-ordinated reflex mechanism of cough, and (3) the peristaltic movement of the muscle of the smaller bronchi. It has been calculated that ciliary movement may propel solid particles at the rate of one inch a minute. Under favourable conditions the cilia can, unaided, bring material from the depths of the bronchioles in a few minutes. The expulsive effect of cough is greatest nearer the larynx, and affects the smaller bronchioles very slightly if at all. The terminal branches of the bronchioles have no cilia and are unaffected by cough, but here peristalsis comes into play. The bronchial secretion is necessary to keep the mucous membrane moist and to dilute irritants. The consistency of the secretion will vary with the dryness of the air and the quickness of respiration. The motor and secretory mechanisms are in great part regulated by the nervous system. Afferent fibres of the vagus pass centrally from the mucous membrane, and efferent fibres pass down to the muscles and secretory glands. The bronchial muscle is also supplied by the sympathetic. These afferent and efferent fibres converge upon a somewhat hypothetical cough centre related to the respiratory and vomiting centres. Expectorants may increase secretion (1) reflexly, (2) by stimulation of the vagus centre, (3) by stimulation of the secretory (vagal) terminations, (4) by direct stimulation of the secretory glands. A large number of drugs which have no common pharmacological property other than that of being gastric irritants have in course of time come to be used empirically as expectorants. Many of these are emetics in larger doses. Ipecacuanha, tartar emetic, ammonium carbonate, squill, and senega belong to this group. A reflex emetic to be useful as an expectorant must not cause so intense an irritation as to produce gastritis, and the mild gastric irritation must be sufficiently prolonged to cause a reflex bronchial secretion of sufficient duration. Ipecacuanha and possibly tartar emetic may have some slight central action, but apomorphine acts entirely by central stimulation, though its action is very transient. Of the drugs stimulating the secretory nerve-ends the only one employed therapeutically is pilocarpine. Great accuracy of dosage is required, otherwise many unwanted effects may be produced, such as constriction of bronchi, œdema of the lung, sweating, and cardiac slowing. When the central nervous system is so profoundly depressed as not to respond reflexly or directly, pilocarpine might be the most reliable expectorant. The most important of the drugs directly stimulating the secretory glands is potassium iodide. Its action is independent of the nervous system. There is no justification for the old classification into stimulant and depressant expectorants. Senega and squill have been classified as stimulant, and ipecacuanha and tartar emetic as depressant, but senega at least acts exactly like ipecacuanha. Squill, whilst acting like ipecacuanha so far as it is an expectorant, has an action upon the heart and is also a diuretic, and possibly acquired its reputation from these added actions.

G. P. Grabfield[2] recommends for obstinate bronchitis **Iso-amylhydrocuprein**, manufactured under the name of **Eucupin.** The dose was 0·05 to 0·2 grm. three times a day. He finds that **Quinine Bisulphate,** 5 gr. three times a day, gives similar results. These drugs were used for their streptococcocidal action, as various workers contend that bronchitis is due to a chronic streptococcal infection. In a few cases they appeared to cause a rapid improvement, but in the majority no improvement was found.

E. J. Kuh[3] uses an oily spray with a De Vilbiss atomizer, the curved tip being introduced behind the relaxed tongue. The composition of the spray is **Menthol** 1 per cent, **Creasote** 1 to 2 per cent, **Camphor** 1 per cent, **Oil of Pine** 2 per cent, in **Albolene** or mineral oil of similar density. Rather less than one ounce is inhaled. He claims good results in chronic bronchitis, asthma, and whooping-cough.

REFERENCES.—[1]*Brit. Med. Jour.* 1927, ii, 972; [2]*Boston Med. and Surg. Jour.* 1927 Nov. 24, 979; [3]*Med. Jour. and Record*, 1927, Nov. 16, 595.

BURNS. (*See also* PLASTIC SURGERY.) *Sir W. I. de C. Wheeler, F.R.C.S.I.*

TREATMENT.—After preliminary treatment by warmth, fluids, and morphia, an anæsthetic is administered, the clothes are removed, and the skin in the proximity of the burnt area is cleansed. The burnt area is swabbed over with ether, blisters are opened, and the loosened cuticle is removed. The whole area is sprayed with a 2·5 per cent aqueous solution of **Tannic Acid.** When this is completed the part is protected by a cradle over which the bedclothes lie, the patient being kept warm and the surface of the burn dry by a few electric lamps suspended within the cradle. The spraying is repeated every hour for the first eight or twelve hours, by which time the burnt area is covered by a dry, brown coagulum. When the face is extensively burnt, a 5 per cent **Tannic Ointment** may be substituted for the 2·5 per cent aqueous solution. When the coagulum begins to separate at the edges, a light sterile dressing should be applied to protect the raw area beneath from contamination. The tannic acid solution should be freshly made every twenty-four hours. Seymour Barling[1] draws attention to these points, and records an interesting illustrative case.

REFERENCE.—[1]*Clin. Jour.* 1928, June 13, 277.

BURSITIS.

Sir W. I. de C. Wheeler, F.R.C.S.I.

Olecranon Bursæ.—W. W. Lasher and L. M. Mathewson[1] deal with the question of acutely distended bursæ over the olecranon process.

TREATMENT.—The earliest possible removal of the bursa is indicated. This cannot be done through small incisions, but requires an incision at least 2 in. in length, which should be longitudinally placed and not transversely. The incision should be slightly elliptic so as not to leave a scar directly over the olecranon. It is better to curve the incision so that the flap is toward the radial side, as the ulnar nerve will thus be less likely to be injured. As there is great difficulty in separating the attached portion of the bursa without opening the periosteum, this small area should be thoroughly curetted and phenolized in order to destroy any secreting cells and to remove completely the infected tissues, and the wound closed without drainage. A tight bandage should be applied with pressure over the bursal site to prevent re-accumulation of fluid. No splinting is required, and motion should be started immediately following the operation and kept up until the date of discharge. In the authors' experience, when an existing osteomyelitis has been thoroughly curetted, there has not been any delay in the closure of the wound, with a single exception, because of the existing bone condition.

They conclude: (1) The olecranon bursa is much larger and more extensive than is usually considered; (2) An acute infection of this structure demands an early operation with complete removal; (3) If an operation is not performed for the condition, an osteomyelitis of the underlying bone is a most frequent complication; (4) Patients seen early and operated on immediately make a rapid and complete recovery.

REFERENCE.—[1]*Jour. Amer. Med. Assoc.* 1928, i, 1030.

CANCER. (*See also under various organs, etc.*)

Sir W. I. de C. Wheeler, F.R.C.S.I.

Radium in Cancer.—The question of employing radium alone, or radium in conjunction with operative treatment, arises frequently in connection with cancer of the tongue, œsophagus, breast, rectum, and gynæcological tumours. The results now obtainable by radium compared with those of some years ago show a striking contrast.

Arthur B. Smith and Sydney M. Smith[1] point out that treatment in *cancer of the tongue* is based on one of two principles—the large dose over a short period, or a relatively small dose over a long period. In both cases the radium is contained in small platinum needles introduced into the growth. The lymphatic areas of both sides of the neck are simultaneously treated by surface radiation. Those who favour the small dose over a long period do so in the belief that more cells are killed during the period of mitosis, and local necrosis is less likely to occur. For some years there has been a disposition on the part of surgeons to abandon the extensive operations advocated in extirpation of cancer of the tongue in favour of radiotherapy. Radium is superior to X rays. Results at least equal to those obtained by surgery have been obtained by needling of the primary growth and simultaneous radiation of the neck. In Smith and Smith's work the technique and dosage are fully described.

In *cancer of the œsophagus*, Guisez of Paris is quoted. The results are good when the disease is limited to the wall of the œsophagus, as shown by the absence of (1) signs of pressure on the recurrent laryngeal nerve, (2) enlarged tracheo-bronchial glands, and (3) demonstrable metastases. The growth is visualized through the œsophagoscope; bougies are introduced to dilate the stricture. Specially made radium-containing œsophageal bougies are employed. Each application requires six or seven hours. The bougie is replaced every second or third day until a dosage of 20·62 m.c.d. has been given. Guisez's figures show patients remaining cured for a time varying from one to fourteen years.

In *extensive and inoperable cases of cancer* radium may be used owing to its hæmostatic effect and the control of discharge. In the monograph referred to above, it is stated that the malignant mass and its whole area of lymphatic drainage is subjected to a continuous and homogeneous gamma radiation. The dose may amount to between 500 and 600 m.e.d., but despite this extensive radiation there is no skin destruction, no bone necrosis, and seldom any very marked general reaction (Sluys).

In *localized recurrence*, needling of the substance of the nodule itself is combined with the introduction in tangential manner of needles in the zone immediately beyond the limits of the lesion.

In *widespread recurrence* and in *pre- and post-operative radiation*, a technique somewhat similar to that employed in inoperable cases can be used.

In the case of treatment of *rectal carcinoma* there are two schools of thought: one recommends a relatively large amount of radium introduced for a short period into the rectum via the natural passage; the other advises recourse to the surgery of access. In the latter case a colostomy is performed and the growth is exposed through the perineal route, after removal of the coccyx. Multiple radium needles of low content are introduced into and around the growth, and also along the line of the superior, middle, and inferior hæmorrhoidal lymphatics. The dosage should approximate 40 m.c.d., over a period of five to seven days.

[The reviewer has on several occasions exposed *inoperable growths of the bladder* by suprapubic cystotomy, and after destruction of the growth with the actual cautery, introduced radium needles into the infiltrated base, bringing the threads attached to the needles out through the suprapubic wound. Surprisingly good immediate results followed.—W. I. de C. W.]

Intravenous Injections of Dextrose during the Radiation Treatment of Malignant Disease.—Some authorities have observed that tumour tissue is more sensitive to radiation, and that the constitutional effects of radiation are lessened, when intravenous injections of dextrose are employed as part of the treatment. It has been stated that in certain cases which gave no response to the radiation treatment a beneficial effect promptly followed when dextrose injections were added. Anything which renders malignant cells more susceptible to radiation deserves study. G. E. Pfahler and B. P. Widmann[2] draw attention to this subject. To test the question intravenous injections of 10 c.c. of hypertonic dextrose solution, from 33 to 50 per cent, were administered before X-ray or radium treatment. In several instances daily injections were given from five to six days after prolonged irradiation. After the second or third injection the dose was increased to 15 c.c., and rapidly brought up to 20 c.c. These writers base their observations on the study of the effects of over 1000 intravenous injections in 111 cases. They think that there is no evidence to indicate that dextrose combined with radiation treatment of cancer improves the end-results, or in any manner renders cancer tissue more sensitive to radiation.

Radiation combined with Lead Therapy.—F. C. Wood[3] refers to Blair Bell's work and the belief that lead injections lead to increased sensitivity of certain neoplasms to the action of röntgen rays. He concludes that the combination of lead and the röntgen ray is more effective than either alone. Wood states that dextrose does not seem to increase the efficacy of the lead in its action on tumours, nor does it apparently increase the efficiency of the röntgen ray.

H. J. Ullmann[4] also deals with the combination of colloidal lead and irradiation in the treatment of cancer. He believes that lead markedly affects certain tumours, and that one of the effects is to render the tumour distinctly sensitive to irradiation. Their sensitiveness does not appear for some little time after an appreciable amount of lead has been given.

Subcutaneous and Intermuscular Sarcomata.—These tumours frequently arise in the arm, leg, popliteal space, and chest wall. They are described as fibrosarcoma, spindle-cell sarcoma, etc., and are referred to by Ewing as neurogenic sarcoma. They are comparatively rare. They are freely movable and accessible, and are too often treated by simple excision. They are frequently mistaken for benign fibromata, with the result that there is local recurrence and, in the end, death from pulmonary metastases. D. Quick and M. Cutler[5] draw attention to the serious nature of these small movable subcutaneous tumours. They state that repeated incomplete excisions frequently result in local recurrence, in a stage of the disease in which radiation and adequate surgery would result in a cure. When situated in the thigh the prognosis is bad; the growths are usually of the myxosarcoma variety; in this situation the grade of malignancy is high. Since the degree of malignancy cannot be determined clinically, pre-operative radiation is indicated in all neurogenic tumours in an attempt to obviate the rapid recurrence which follows simple excision in the very malignant type. The best treatment in these apparently innocent, but often extremely malignant, tumours is pre-operative radiation followed by wide local excision and immediate post-operative radiation.

Quick and Cutler believe that the rapid response of a soft-part subcutaneous tumour to external radiation is an indication of its highly cellular and malignant nature and is a contra-indication to surgical removal. Prolonged external radiation is the method of choice in the treatment of this type of growth.

Chromoma of the Forearm.—In contrast to the tumours just described may be mentioned an ulcerous malignant tumour of the forearm which is described under the title 'chromoma of the forearm' by A. E. Hertzler.[6] In these cases there is a history of a wound or contusion followed by a rounded painless tumour which rapidly protrudes through the skin. Hertzler thinks that these tumours are derived from the chromatophore cells. He believes that these cells are capable of producing a slowly-growing tumour or ulcer which disseminates by way of the lymphatics and proceeds relentlessly to a fatal issue. The cells are not associated with epithelial elements, though they resemble very much anaplastic epithelial cells.

Prognosis and Treatment of Giant-Cell Sarcoma.—W. B. Coley,[7] discussing this subject, deals with two very important points: (1) Whether giant-cell sarcoma is always a benign lesion; (2) The best method of treating these cases. He is of opinion that, while the majority of giant-cell sarcomata are benign or only locally malignant, there is a certain number of cases which give rise to metastases and generalization of the disease. This belief is confirmed by many other authorities. Thus, even although the X-ray and pathological evidence is all in favour of benign giant-cell sarcoma, the prognosis in such cases should be carefully guarded. In the majority of cases the clinical and röntgen-ray evidence is sufficient for the diagnosis of benign giant-cell sarcoma, but in about 20 per cent of the cases it is impossible to differentiate the benign from the malignant type without microscopical examination. **Thorough Curettage** is recommended by Coley in central tumours of the long bones, followed by the use of **Carbolic Acid** or **Zinc Chloride.** These tumours are extremely vascular, and fatal hæmorrhages have resulted from a simple curettage. A tourniquet should always be employed, and the curettage should be as thorough as possible. The resulting cavity should be packed with gauze soaked in Dakin's solution. Coley believes that, in addition to curettage and carbolic acid or zinc chloride, injections of the **Mixed Toxins** of erysipelas and *Bacillus prodigiosus* for a period of three or four months after operation greatly lessens the chances of a recurrence of the disease.

It is stated that a number of cases of giant-cell sarcoma have been cured by **Radiotherapy,** but the number of cases so treated is too small and the period of observation too short to permit the conclusion that radiation should be the method of choice. It has been said that the use of radium after curettage increases the chances of infection. There is no doubt that X-ray therapy increases the tendency to infection in certain branches of general surgery. [The reviewer has recently seen two cases of very severe infection follow operation for prostatic enlargement previously treated with röntgen rays. Attention has been called to this also by Thomson-Walker.—W. I. de C. W.] Coley advises against radium or X rays following curettage. He finds it impossible to express an opinion as to which form of radiation—that is, radium, high-voltage or low-voltage röntgen-ray—gives the best results without operation.

Absence or Diminution of the Hydrochloric Acid of the Gastric Contents in Cancer other than that of the Stomach.—It is common in hospital practice to find an absence of hydrochloric acid in cases of cancer of the colon or elsewhere, and, on the other hand, free hydrochloric acid is found in the early stages of many cases of gastric cancer. In a series of 17 cases of malignant disease in different situations such as the uterus, mamma, prostate, rectum, tongue, cheek, and mouth, hydrochloric acid was absent in the stomach in about two-thirds of the cases, while in the remainder the amount found was much below normal. These observations were made by Moore, Kelly, and Roaf (quoted by J. Friedenwald and L. T. Brown[8]). The achylia persists even following removal of the growth. It may be concluded that in doubtful cases of cancer, no matter where the situation of the growth, the absence or diminution of the hydrochloric acid of the gastric secretion may be a factor in aiding diagnosis.

(*See also* RADIUM AND X-RAY THERAPY.)

REFERENCES.—[1] *Radium in Cancer and Surgery of Access*, 1927, H. K. Lewis, London; [2] *Jour. Amer. Med. Assoc.* 1927, ii, 1492; [3] *Ibid.* 1216; [4] *Ibid.* 1218; [5] *Ann. of Surg.* 1927, Dec., 810; [6] *Ibid.* 1928, Jan., 99; [7] *Ibid.* 1927, Nov., 641; [8] *Med. Jour. and Rec.* 1927, Oct. 19, 491.

CANCER, INTRACTABLE PAIN IN. (*See* PAIN, INTRACTABLE.)

CARBUNCLE. (*See* SKIN, STAPHYLOCOCCAL INFECTIONS OF.)

CARDIAC DYSPNŒA.

A. G. Gibson, M.D., F.R.C.P.

Cardiac dyspnœa has been investigated from the experimental side by F. R. Fraser[1] in his Goulstonian Lectures. Increased respiratory activity without distress or consciousness of effort may be termed hyperpnœa; whenever the respiratory mechanism fails to cope with ease to supply what the bodily processes require, then the patient experiences distress which is called dyspnœa. An increased respiratory activity is always present in the dyspnœa of health, but in disease, when there may be a lesion of the respiratory centre, this increased activity is precluded. Examination of the arterial blood will show whether increased breathing is the result of increased carbon dioxide in the arterial blood, or of an increase of fixed acids (H-ion concentration), or of oxygen lack. In a group of cases of mitral stenosis in which all except one had dyspnœa and cyanosis, it was found that there was an approximation to the normal limit of oxygen saturation (95 per cent) except in one case. In another group of cases with high blood-pressure and arterial disease there was also no gross deviation from the normal saturation percentage. In other cases in which there was a pulmonary as well as a cardiac complication, again the saturation of oxygen was normal. In one case only with severe chronic bronchitis and emphysema the percentage was definitely low. The dyspnœa of cardiac failure therefore is not due to a low oxygen saturation of the blood reaching the respiratory centre. As regards cyanosis, while it is marked in mitral stenosis even when the oxygen saturation of the arterial blood is normal, in the myocardial degeneration of arteriosclerosis it is only pronounced when failure is advanced, pulmonary affection severe, and oxygenation of the arterial blood deficient.

As regards the carbon dioxide and hydrogen-ion concentration in arterial blood, it was found that in extreme congestive cardiac failure, and when pulmonary disease accompanies cardiac failure, faulty elimination of carbon dioxide and faulty absorption of oxygen may be factors in producing dyspnœa. In cases also near death retention of fixed acids and raised H-ion concentration may be factors. In cases of cardiac dyspnœa other than these, whether from mitral stenosis or myocardial failure, the condition of the arterial blood cannot account for it. Discussing the evidence that exists for the cause of dyspnœa, it is concluded that owing to an increase in the metabolic rate in these cases, together with a slowing of the circulation, the centre receives less oxygen than normal, and that oxygen want is the true stimulus. In cases with pulmonary disease in addition, and cases of severe failure with pronounced secondary changes in the lungs, raised carbon dioxide pressure and increased H-ion concentration will act as an additional stimulus. These factors in their turn produce a diminished vital capacity by engorgement of the pulmonary circulation and fatigue of the centre, so that the need for increased ventilation cannot be met without conscious respiratory effort; it is this that produces the distress. The fundamental cause of cardiac dyspnœa is insufficiency of the myocardium.

Attacks of cardiac asthma, according to Coombs,[2] are most frequent in men above 60 and occur only at night. In three-quarters the blood-pressure is high. The left ventricle is hypertrophied, and the symptoms are associated with ventricular defeat, for œdema is common; pain is usually absent. The attacks occur soon after getting into bed, or they wake the patient up with a feeling of suffocation or with terrifying dreams. **Morphine** is the best drug, but it is also necessary to arrange to give the patient proper head support while sitting up before the paroxysm ceases. **Caffeine** or **Diuretin** are the best drugs in the intervals. A case is described of acute suffocative œdema coming on in a female age 60 under conditions similar to cardiac asthma. Diuretin and bleeding are recommended.

REFERENCES.—[1]*Lancet*, 1927, i, 529, 590, 644; [2]*Brit. Med. Jour.* 1928, i, 1009.

CATARACT.

Lt.-Col. A. E. J. Lister, I.M.S. (retd.).

Adrenalin in Dilating the Pupil in Operations for Traumatic Cataract.—N. Dascalopoulos[1] says that all those who frequently operate for traumatic cataract have been troubled by the contraction of the pupil after the corneal section, even though it has been previously dilated by atropine. Though not insurmountable, this creates a technical difficulty which may nevertheless somewhat frequently endanger the chance of a perfect result in this operation. The contracted pupil renders difficult the evacuation of the lens matter, some of which remains behind the iris; also, in introducing a curette into the anterior chamber to assist in the evacuation of lens matter, the iris is apt to be rubbed by the curette. This may irritate the iris and lead to the formation of adhesions. The contraction of the iris is caused by the escape of the aqueous, tending to form a vacuum. This leads to filling up of the vessels of the iris and a consequent thickening of the iris, and a contraction of the pupil. This may be prevented by the injection of about ½ c.c. of a mixture containing 1·5 c.c. of a 2 per cent solution of **Novocain** and ½ c.c. of a 1–1000 solution of **Adrenalin.** The site of injection, which is a subconjunctival one, is at the upper extremity of the vertical meridian (if the keratotomy is above). After the injection, one should wait for ten to fifteen minutes before operating. By this means a very marked dilatation of the pupil is obtained, so marked indeed that it is almost hidden behind the limbus. Novocain is used, firstly, because it is always available in the clinic, ready sterilized, and, secondly, because it avoids the slight pain caused by the injection of adrenalin. After the injection, the pupil remains widely dilated after the escape of the aqueous humour, facilitating the subsequent operative procedures. The author, it may be mentioned, prefers to remove a portion of the posterior capsule at the time of operation to ensure a better optical result. The dilated pupil renders this easy. The use of adrenalin, in the author's opinion, tends to counteract the tendency to a rise of tension which may follow this procedure. In every case in which the author has used this procedure it has up to now been successful.

Treatment of Congenital Cataract.—L. Webster Fox[2] pleads for variety of surgical treatment of this important condition. He finds that examination with the slit-lamp (a proceeding requiring much skill and patience in very young patients) shows that the corneal area is more often clearer at the periphery than is usually supposed to be the case. If this is so, a small **Peripheral Iridectomy,** accurately placed to allow of binocular vision, is the operation of choice. Very small children often cannot wear thick cataract glasses. If the iridectomies are successful, accommodation as well as convergence and synchronous rotation of the globes is encouraged, which is so essential for perfect co-ordination at reading distances. The value of this is enormous. It is procured in these cases at the most ideal time of a child's life and without glasses, and, should removal of the crystalline lenses be required at a later period, the embarrassing muscle complications are reduced to a minimum. The author discusses operative technique, and points out that after a needling operation it is often possible to remove the empty capsule, which is all that is left in certain cases, through a corneal incision. This frees the eye from what is really a foreign body, which is liable to set up iridocyclitis at any time. It is a proceeding which requires care, but we are repaid by the resulting perfectly clear pupil and freedom from a source of subsequent inflammatory trouble. [The reviewer's experience is similar to that of the author. Even if it is not possible to remove the whole of the capsule, it is sometimes possible to remove a portion near the centre which gives a good visual result.—A. E. J. L.]

Choroidal Hæmorrhage in Cataract Extraction.—L. Ziegler[3] has made a careful study of this truly terrible complication of cataract extraction. He concludes that the chief etiological factors are vascular degeneration and decompression of the globe. The second eye requires prophylactic therapy and complete discission of the lens by the V-shaped method. The original paper must be consulted for many details as to treatment.

Endocrine Cataract (*Cataracte Endocrinienne*).—J. Nordmann[4] describes cases and brings forward facts which he thinks point to a disturbance of the endocrine functions as being in some cases the cause of early acquired cataract. The original article must be consulted for details. He distinctly states that he is alive to the fact that other causes may produce a cataract of the types described, which are very variable. He concludes with the following remarks: "One ought to think of this origin [i.e., endocrine] whenever one finds oneself in the presence of a relatively young individual who has bilateral cataracts which tend to develop superficially and which are not explicable by a local cause."

The Use of a Palpebral Suture with or without a Bandage in Cataract Operation.—Jacqueau,[5] in a thoughtful article, advocates the use of a suture to close the lids in certain special cases. He used it first in an insane person. The silk suture is passed, after injection of a local anæsthetic, through the lower edge of the upper lid, passing through the tarsus horizontally. If an escape of vitreous is feared, the speculum can be removed and the lid lifted by means of the suture. At the end of the operation, the needle at the lower end of the suture is passed through the lower lid, and the suture is tied not very tightly. A very light bandage is applied. The patient is unable to open the lids, and the eye can be inspected later without danger. The state of the globe can be seen by inspection on either side of the suture, and if required the conjunctival sac can be irrigated or collyria applied. The suture is removed about the seventh day. [Every operator of experience has had cases in which the patient has been restless or foolish, and has turned down the corneal flap by catching it on the edge of the upper lid. In certain cases the manœuvre described would avert this accident, though it is not of course free from objections.—A. E. J. L.]

REFERENCES.—[1]*Ann. d'Oculist.* 1928, April, 251; [2]*Jour. Amer. Med. Assoc.* 1927, Dec. 31, 2249; [3]*Contributions to Ophthal. Science* (Jackson) 1926, 7 (abstr. *Ophthalmol. Year Book*, 1927, 139); [4]*Ann. d'Oculist.* 1928, 29; [5]*La Clin. Ophtal.* 1927, 435.

CATARRH, NASOPHARYNGEAL. (*See* NASOPHARYNGEAL CATARRH.)

CEREBROSPINAL FEVER.

J. D. Rolleston, M.D.

ETIOLOGY.—S. McLean and J. P. Caffey[1] record their observations on 136 cases in patients from twenty-three days to seven years old; 17·6 per cent were not over three months of age, and 67·6 per cent were in the first year of of life. The disease occurred almost uniformly in districts in which crowding, poverty, and poor hygiene were prevalent. Maternal nursing did not tend to produce immunity, as of 22 infants not more than three months old 18 had been nursed exclusively up to the onset of the disease; of 27 of ages three to six months 21 had been nursed exclusively; and of 28 from six to nine months old 15 were still being nursed by their mothers when the first symptoms appeared.

SYMPTOMS AND COMPLICATIONS.—The frequency of the principal symptoms and complications in this series was as follows: muscular rigidity, especially of the neck, with or without retraction of the head, 85 per cent; Kernig's sign, 41 per cent; Brudzinski's sign, 36 per cent; unexplained irritability, one of the most valuable signs, 62·5 per cent; bulging fontanelle, 56·6 per cent; convulsions, 29·4 per cent; hæmorrhagic eruption, 11 per cent; vomiting, 56·6 per cent; diarrhœa, only 2 per cent; tache cérébrale, 30·8 per cent; strabismus, 20·5 per cent; there was no characteristic temperature chart. Fever was frequently absent in the acute stage of the disease.

F. Bonnet,[2] who records a case complicated by *hemiplegia*, states that central paralyses are not very common in meningococcic infection. They generally appear within the first six days of the disease, and occasionally after convulsions or Jacksonian epilepsy. As a rule the paralysis takes the form of hemiplegia, which is flaccid at first but soon becomes spastic. The facial paralysis involves chiefly the muscles supplied by the lower branch of the facial nerve, with comparative immunity of the orbicularis palpebrarum and frontalis. Bonnet's case occurred in a soldier of 21, who developed complete left hemiplegia on the fourth day of meningococcic meningitis which had been treated by specific serum. The paralysis, which was at first flaccid, became spastic, but ultimately almost complete recovery took place.

S. Levy[3] records the following unique case of meningococcic meningitis complicated by *gangrene*. The patient was an infant, 2 months old, who about a month after the onset of a severe attack developed asphyxia of both hands and feet, which subsided in the course of a day in the feet and left hand, while in the right hand gangrene developed, causing loss of the terminal phalanx of the index finger and small necroses of the other fingers. Necrotic areas also formed simultaneously on the left parietal bone. No fresh necroses ensued in the course of fourteen months, but death took place with signs of increasing hydrocephalus. There was no necropsy. Although the unilateral involvement was in favour of thrombosis or endarteritis, there was no evidence of cardiac disturbance, and Levy was inclined to regard the case as one of Raynaud's disease.

REFERENCES. [1] *Amer. Jour. Dis. Child.* 1928, xxxv, 357 ; [2] *Jour. de Méd. de Bordeaux*, 1928, 99 ; [3] *Zeits. f. Kinderheilk.* 1927, xliv, 230.

CEREBROSPINAL FLUID IN BRAIN TUMOUR. (*See* BRAIN, TUMOURS OF.)

CEREBROSPINAL FLUID IN CHILDREN.

Reginald Miller, M.D., F.R.C.P.

Two important papers have been published during the year on this subject: one dealing with the cerebrospinal fluid in normal children, and the other in ill children. D. Stewart,[1] examining normal infants and children, finds minute differences in the cerebrospinal fluid depending on whether it is withdrawn from the spinal canal, as in lumbar puncture, the cisterna magna, or the lateral ventricles. The cells, for instance, are more numerous in the lumbar fluid than in the cistern fluid, and they are practically absent in the ventricular fluid. The cells normally number from 20 to 30 per c.mm. in infants, and the count gradually diminishes as age increases, becoming identical with that of adults (3 to 7 per c.mm.) at the age of 10 or 12 years. The protein content of the lumbar fluid is found not to vary according to age, and to be very similar to that of the lumbar fluid in adults. The sugar content was found to vary directly with the sugar content of the blood. The chloride content was found to be similar to that found in adults, only with a larger field of variation (630 to 760 mgrm. per 100 c.c. as compared with a variation of 720 to 750 in adults).

A. V. Neale and M. S. Esslemont[2] have studied the chemistry (chloride, sugar, and calcium contents) of the cerebrospinal fluid in sick children, and have brought out one or two points of considerable interest to clinical workers. The chief of these is the criticism of the accepted view that the chloride content of the cerebrospinal fluid is always low in tuberculous meningitis. They state that this is usually so only in the earlier stages of the disease, and that in the later stages the chloride content shows a rise. Thus, the stage of the disease in any particular case has to be taken into account in the interpretation of the chemical result. Again, in meningococcal meningitis there is a tendency for the chloride and sugar contents to recover from their lowered figure and to rise to the normal if the case is recovering. Such rises may therefore be taken to be a favourable prognostic sign. Cases of pneumococcal meningitis show a progressive fall in the chloride content of the cerebrospinal fluid towards the fatal issue. In this connection it is of interest to note that the only non-meningitic disease in which the chloride content of the fluid was altered was pneumococcal infection. In acute pneumococcal infection without meningitis there is a lowered chloride content.

REFERENCES.—[1] *Arch. of Dis. in Childhood*, 1928, iii, 96 ; [2] *Ibid.* 243.

CHANCROID.

Col. L. W. Harrison, D.S.O.

White and Owsley[1] treated 25 cases of chancroid by applications of (*a*) a saturated solution of **Silver Nitrate** crystals in 28 per cent **Ammonia,** (*b*) 25 per cent **Formaldehyde,** and (*c*) pure oil of **Eugenol,** in the order named. The time to complete healing was ten to fifteen days, as compared with one to three months under other forms of treatment. M. Garriga[2] treated 65 cases of soft chancre by **Nicolle's Vaccine.** He found the intravenous route to be the best, though it caused rather severe general reaction, particularly high and continued fever. In cases where general reaction is feared, the intracutaneous route should be employed, though it is not so efficacious. The effect of the vaccine is not particularly marked in ordinary cases of chancroid [possibly because most genital ulcers diagnosed as soft chancre are not caused by Ducrey's bacillus —L. W. H.], but is good in those which are deep and spreading. De la Riva[3] also finds the intravenous route to be the best, but the violent reactions which follow its use limit its application to cases which have resisted milder measures. **Auto-hæmotherapy** has been found by Clusellas[4] to be valuable in cases of bubo. Even when these had reached the suppurative stage, the injection prevented external rupture of the abscess. The initial dose was 5 c.c., increased to 10 c.c. The injections were given into the buttocks every other day.

REFERENCES.—[1]*U.S. Naval Med. Bull.* 1927, July, 619 ; [2]*La Med. Ibera*, 1928, March 10, 261 (abstr. Epit. *Brit. Med. Jour.* 1928, April 14) ; [3]*Revista méd. de Sevill*, 1928, Feb., 41 ; [4]*Semana méd.* 1927, April 21 (abstr. *Jour. Amer. Med. Assoc.* 1927, Aug. 6).

CHEST, SURGERY OF.

Sir W. I. de C. Wheeler, F.R.C.S.I.

Thoracoplasty and Thoracotomy : Surgical Treatment of Pulmonary Tuberculosis.—Much attention is given in current literature to these operations: extrapleural thoracoplasty for the cure of pulmonary tuberculosis, and intrapleural thoracotomy for the removal of intrathoracic growths. In previous numbers of the MEDICAL ANNUAL the admirable results following radical operation in certain diseases of the chest were recorded, but notwithstanding the optimistic reports of J. T. Morrison, Gask, Dumarest, Duval, Tudor Edwards, and many others, this branch of surgery has not received due recognition by those practising medicine. Duval pointed out that safety lies in securing a wide opening into the chest and as complete collapse as possible of the lung on that side. Lilienthal pleads that in exploratory thoracotomy we have a simpler and more effective method of diagnosis than in exploratory laparotomy. Extrapleural thoracoplasty is indicated in cases of tuberculosis of the lungs when one lung is healthy or the disease is inactive. Artificial pneumothorax is a good form of preliminary treatment, but the lung expands again, and if a good result is not obtained after reasonable trial, operation is indicated. Thoracoplasty, combined with phrenic avulsion in selected cases, has saved many lives. The former operation is performed through a long J-shaped incision placed behind to expose the posterior half of the thoracic wall. Two or three inches of the ribs are removed without opening the pleura.[1]

A. A. Law[2] points out that the necessary rest in unilateral pulmonary tuberculosis can only be obtained by collapsing the lung. He thinks that in 80 per cent of cases artificial pneumothorax suffices, but in the other 20 per cent adhesions between the parietal and visceral pleuræ prevent collapse. Even after thoracoplasty collapse is not complete in a small proportion of cases. This is sometimes due to the rapid re-formation of bone at the point of resection near the vertebræ. When the base of the lung is actively diseased or fails to collapse completely after thoracoplasty, avulsion of the phrenic nerve is indicated. It is only necessary to avulse 10 to 12 cm. of the nerve in order to ensure complete paralysis of the diaphragm on that side. Figures quoted by

Law show that, in a study of 1159 operated cases in America and abroad (Alexander), 36·8 per cent are cured and 24·4 per cent are decidedly improved.

H. Lilienthal[3] points out that it is necessary to employ artificial pneumothorax every few weeks in order to maintain the lung at comparative rest. The test of cure after temporary rest comes when the lung is again permitted to function. Fibrosis, or an organized exudate upon the visceral pleura, may prevent expansion. If expansion occurs, it is followed by a lighting up of the disease. The first step in producing permanent rest for an incurable lung is phrenic nerve avulsion; mere division does not put out of action accessory nerve fibres, and the diaphragm still functions. The nerve should be exposed through a transverse incision upon the clavicle. The operation often is followed by cessation of hæmoptysis. Nature seems to make an attempt to create rest in early tuberculosis by diminished motion or even rigidity of the diaphragm, even in the presence of a small area of apical disease. In discussing thoracoplasty, Lilienthal states that resection or even the mere division of the ribs near the spine is followed by a variable but often great reduction in the size of the thorax. In order to gain the greatest effect it is essential that the first rib should be resected or at least divided, and this should be done in the first stage of the thoracoplasty. Direct union of the cut ends of this rib rarely if ever occurs. The full collapsing effect of the operation may not be manifest at first and its progress may continue for months or even a year. He emphasizes the fact that it is not the mere collapse or compression of the lung which arrests the tuberculous process, it is much more the limitation or abolition of the respiratory movement.

Discussing single large cavities in the upper chest, he says that the principles of draining the cavity through the bronchus by forced compression should be considered, but if this is not possible, cough and profuse expectoration may be met by draining the lung externally. The first attempt should be by posterior thoracoplasty of the upper five or six ribs. Ordinarily, the negative pressure within the pleural sac tends to contract the thorax when the ribs have been mobilized.

Drainage of pulmonary tuberculous cavities through the chest wall should be avoided if drainage by compression can be accomplished. It is not, however, the calamity which it was formerly believed to be. It is an operation only to be adopted when all other methods fail.

Lilienthal sums up his admirable paper as follows:—

1. Rest and drainage are the two important mechanical objects of the surgery of pulmonary phthisis.
2. Rest may be temporary and in varying degrees, or it may be permanent in varying degrees even to the complete abolition of lung function.
3. There are extrathoracic methods. Those relating to the phrenic nerve are described.
4. Operations upon the thorax itself deal with rest and with forms of drainage, either by way of the air-passages and mouth or via the wound.
5. The obliteration of pulmonary cavities or of diseased areas of the pleural sac are described. Speaking broadly, this obliteration is a form of drainage.
6. Pulmonary collapse and compression are aided by the suction power of negative intrapleural pneumatic tension. This negative pressure cannot operate when there is an air passage through the chest wall. It cannot operate in the case of large intrapulmonary cavities which directly open into the normal outside air through a large bronchus.
7. Methods of operation are described and there is a discussion of the mechanical principles on which they are founded.

Removal of Portion of First Rib.—This operation is necessary as part of the thoracoplasty adopted in the treatment of pulmonary tuberculosis. It has also to be considered in cases of compression neuritis. The reviewer has described an operative technique.[4]

J. R. Coffey[5] states that in the suppurative lung conditions artificial pneumothorax is often impracticable, because (1) the diffuse inflammation has made the lung adherent to the chest wall, (2) the rapid formation of pus keeps the cavities distended, (3) bronchial fistulæ are liable to develop, or (4) the abscess may rupture into the pleural cavity and impose an empyema upon a condition that is already exceedingly grave. Adequate surgical collapse is impossible without the removal of a section of the first rib. The first rib forms a protective cage for the apex of the lung and forms the support and the line of fixation for the entire side of the thorax. This rib is held up by the scaleni, anticus and medius. The operations employed for the surgical collapse of the lung provide for the posterior removal of the first rib from below. This procedure has several drawbacks; the author has devised an operation that simplifies the removal of the first rib, and by gaining the collapse obtained from its removal renders further collapse more easy and diminishes the sum total of operative shock.

The patient lies upon his back on the table with the arms extended down the sides and a sandbag placed under the shoulder of the involved side. The arm on the involved side is pulled farther down the table and fastened, while that of the opposite side is relaxed. This lowers the shoulder girdle on the involved side. The incision is made to bisect the angle the apex of which is the posterior junction of the sternocleidomastoid muscle and the clavicle, the sides of which are formed by the clavicle and the base of the neck. The incision starts at the trapezius border and ends at the manubrium, and penetrates the skin and platysma (*Fig.* 8). Retraction is made on the sides of the wound. The external jugular vein, coming down the posterior border of the sternocleidomastoid muscle, and ducking behind this muscle, obtrudes itself (*Plate XI*). The external jugular vein is dissected downward to a point below where the suprascapular vein branches off posteriorly. This vein is doubly ligated and cut. The external jugular vein is followed upward to its next posterior branch, the transversa colli vein. This is doubly ligated and cut. The external jugular vein is then doubly ligated and cut below the tied stump of the suprascapular vein and above the anterior branching of the anterior jugular vein. The posterior two-thirds of the clavicular portion of the sternocleidomastoid muscle is cut across slightly above its attachment to the clavicle, leaving sufficient muscle and tendon attached to the clavicle for re-suturing. The upper severed portion of the sternocleidomastoid muscle with the upper tied stump of the

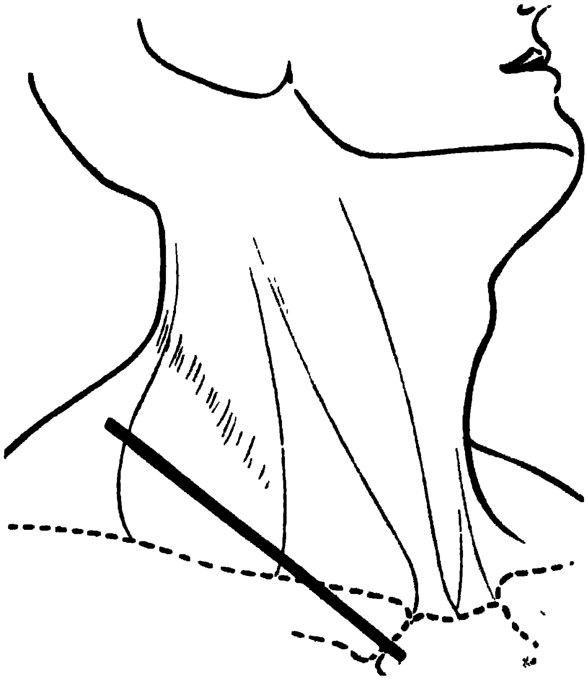


Fig. 8.—Diagram of the external surface of the posterior triangle of the neck, showing the line of incision. (*By kind permission of 'Annals of Surgery'.*)

jugular vein is retracted forward. The operator finds himself over a space, usually filled with fat and lymphatic glands. The content of this space is carefully dissected out, keeping watch for two transverse arteries—below the suprascapular, above the transversa colli or transverse cervical—both branches of the thyroid axis which emanates from the subclavian artery immediately anterior to the scalenus anticus muscle. These are doubly ligated and cut at a point where they cross the scalenus anticus muscle. The peripheral branches of the brachial plexus are disregarded. The omohyoid muscle is doubly ligated and cut where it crosses the scalenus anticus muscle, traction sutures being left on each end so that these ends may be used for retractors. All fat and glandular tissue is dissected away and the overlying structures are retracted backward and forward (*Plate XII*). No sharp retractors should be used from this time on. The operation to this point resembles the preliminary steps in the operation for the removal of cervical rib as described by Adson and Coffey.[5]

Attention is then fixed upon the phrenic nerve. If the diaphragm is to be paralysed the phrenic nerve is cut and the peripheral end is avulsed. If not, the nerve is freed from the muscle so that the muscle, which is soon to be cut, will not pull upon the nerve as the muscle retracts. The scalenus anticus is then severed at its attachment to the first rib. It is well to leave a portion of the muscle attached to form a bed later for the subclavian artery. Immediately within lies the pleura, forward the carotid sheath. A gauze tape is slipped around the subclavian artery and it is gently retracted forward into the space formerly occupied by the scalenus anticus muscle, disclosing the bed of the subclavian arch, the subclavian groove in the first rib. Separate tapes are slipped around each trunk of the brachial plexus, and they too are very gently retracted forward. The subclavian groove is fully exposed (*Plate XIII*). The nerve of Bell, as it runs down the side of the scalenus medius and crosses over the first rib, may in certain cases be avulsed with advantage. The serratus muscle is thus put out of action ; it is an important accessory muscle of respiration. The scalenus medius is cleanly severed from its attachment to the first rib. The rib is exposed up to the lateral vertebral process of the first thoracic vertebra, and cleaned on all sides with a rib stripper. It is divided at the upper inner edge of the subclavian groove and at the transverse process behind (*Plate XIV*). Care must be taken of the vertebral artery in the latter situation. Marked collapse of the lung takes place immediately, so much, indeed, that it is ample for many apical lesions.

Yates[6] says that the local lesions are the points where the battles against the bacteria are won or lost, and the outcome of the struggle depends almost entirely upon the quality and quantity of blood delivered to these areas. He suggests rest, suitable diet, exposure to sunlight, and repeated transfusions of unmodified blood, as suitable weapons against the disease. Thoracoplasty, he says, is only a means to aid the healing of a local lesion, and should be avoided if possible, because it produces permanent impairment of the external respiration with reduction of the vital capacity. Temporary block of the phrenic nerve by crushing, rather than a permanent diaphragmatic paralysis, is recommended. If measures of the kind suggested are not effective in a month or two, ribs may be removed. He states that in a considerable number of cases healing occurs, in all except a few with larger lesions confined to one lobe, frequently the upper lobe. Lobectomy performed with the cautery is indicated under these circumstances.

Intrathoracic Tumours.—Too much emphasis cannot be laid on the necessity for operation in cases of intrathoracic growth. It is almost impossible to tell the nature of the growth before operation. Many of them are benign and can easily be removed. The accompanying X-ray photograph (*Plate XV*) is that

PLATE XI.—THORACOPLASTY: REMOVAL OF FIRST RIB

([illegible] P. COFFEY.)

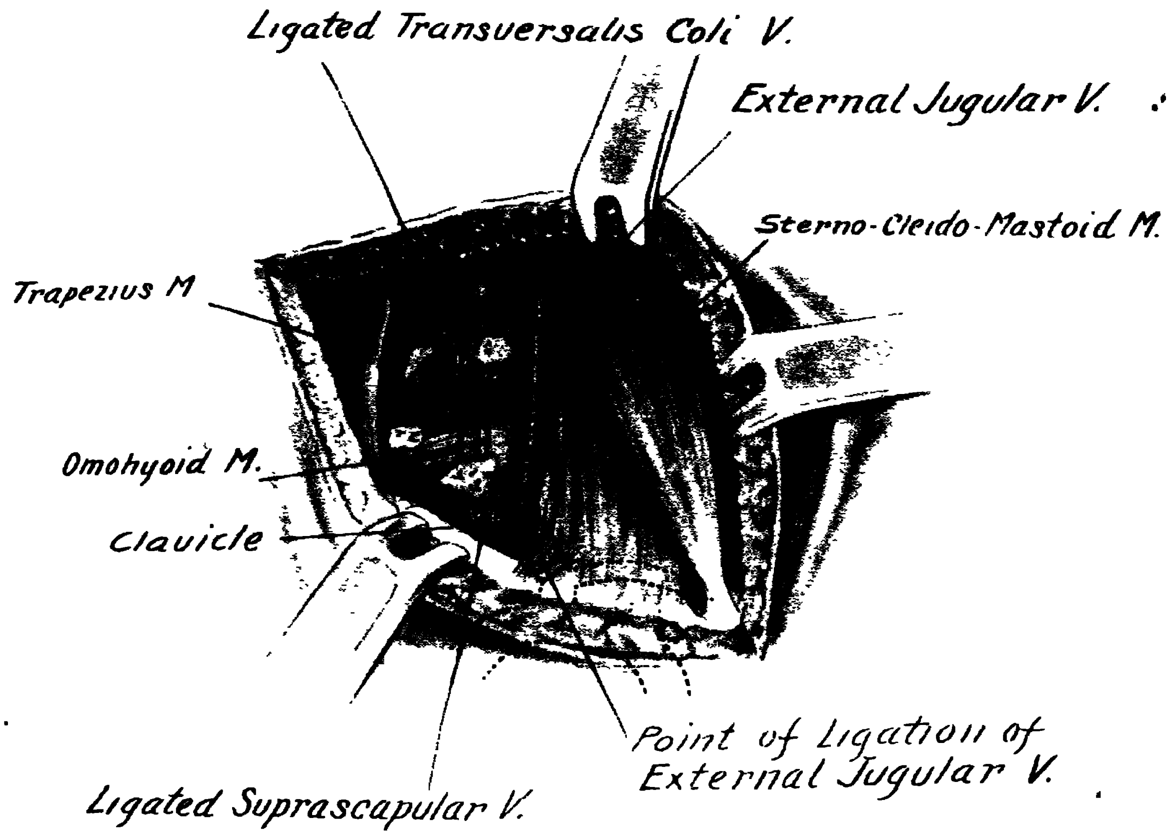


Fig. 1.—The skin and platysma have been retracted, disclosing the external jugular vein and its branches. Points for severance are indicated. The omohyoid muscle is seen through the lymphatic and fatty space behind the sternocleidomastoid muscle.

Plates XI–XIV by kind permission of 'Annals of Surgery'

PLATE XII.—THORACOPLASTY. REMOVAL OF FIRST RIB—*continued*

(J. R. COFFEY)

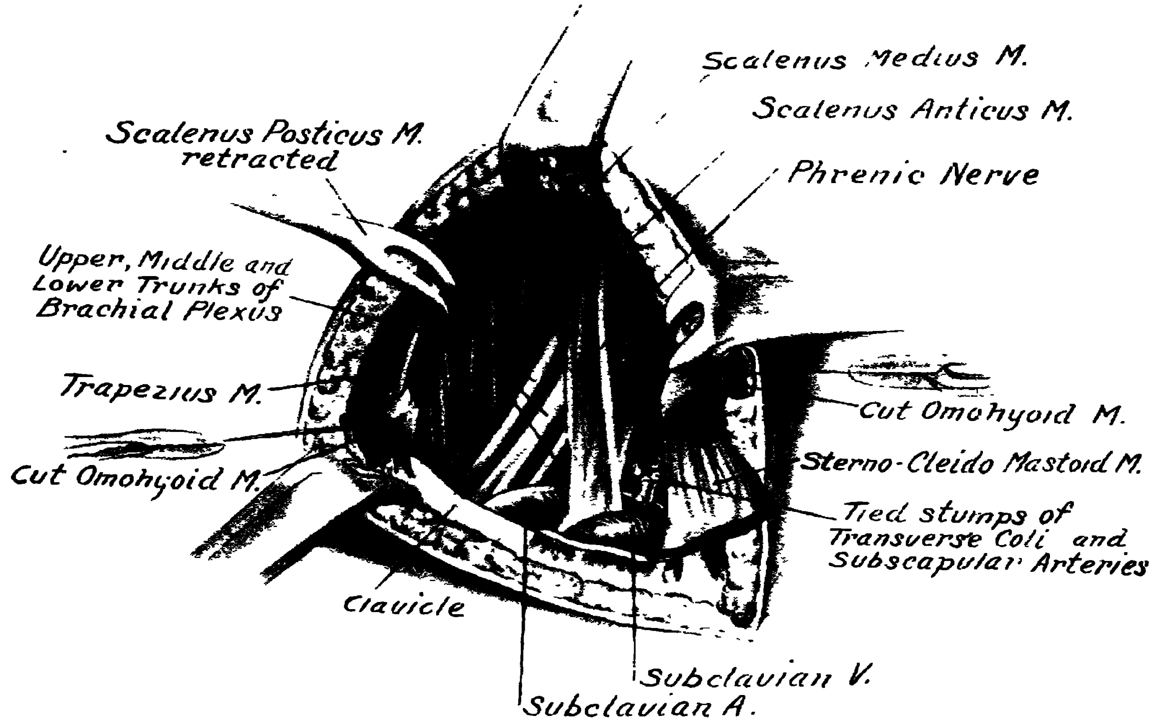


Fig. 8.—The transversa colli and supra-scapular arteries have been ligated and cut. The omohyoid has been cut, and traction sutures have been attached to its ends to act as retractors. The lymphatic and fatty tissues have been dissected away, exposing the lateral region of the first rib.

PLATE XIII—THORACOPLASTY REMOVAL OF FIRST RIB—*continued*

(J. R. COFFEY)

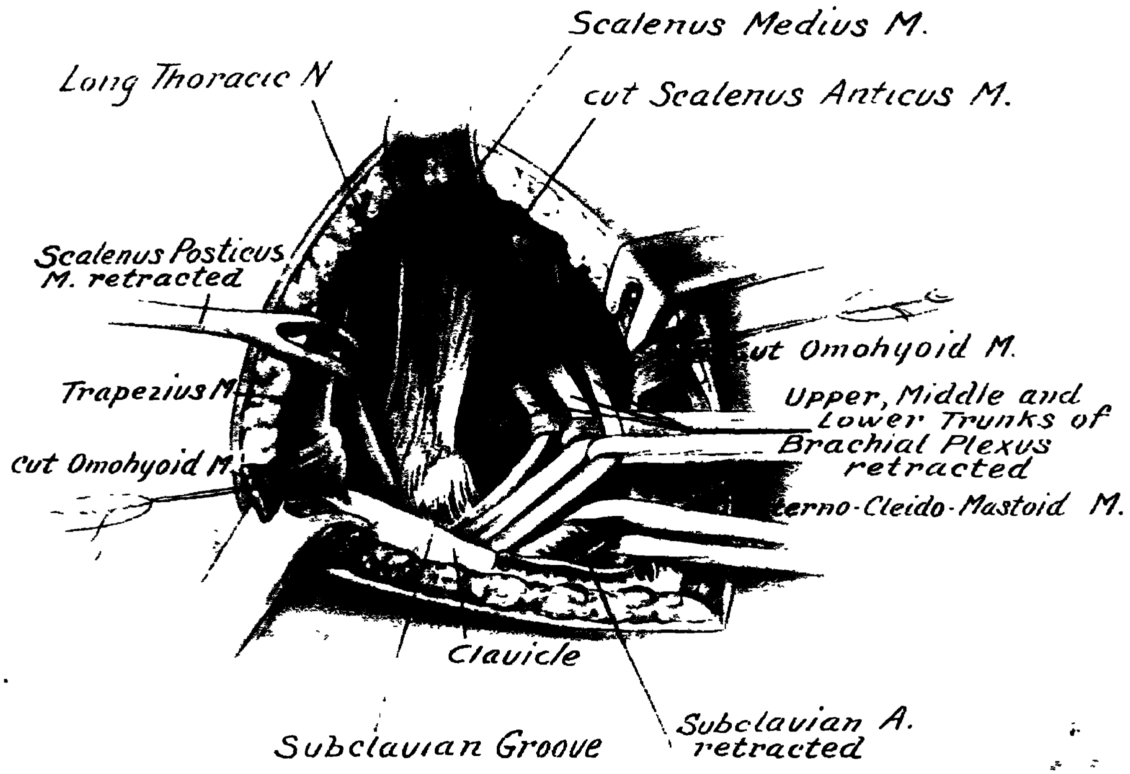


Fig. C.—The scalenus anticus muscle has been cut and is retracted upward. The phrenic nerve has been avulsed. The subclavian artery has been retracted into the space formerly occupied by the scalenus anticus muscle and the brachial plexus has been retracted forward, uncovering the subclavian groove. The long thoracic nerve is seen coming through the scalenus medius muscle, running down its lateroposterior side and crossing the first rib.

PLATE XIV—THORACOPLASTY REMOVAL OF FIRST RIB—*continued*

(J. R. COFFEY)

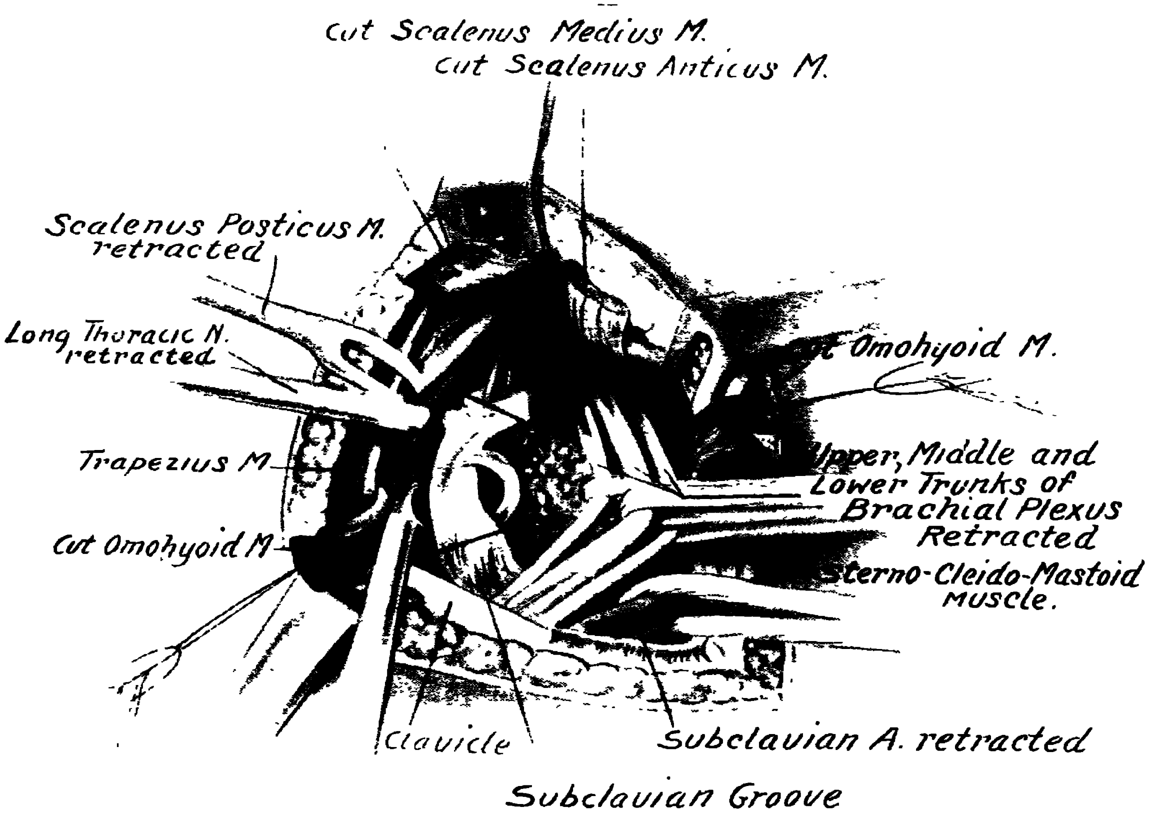
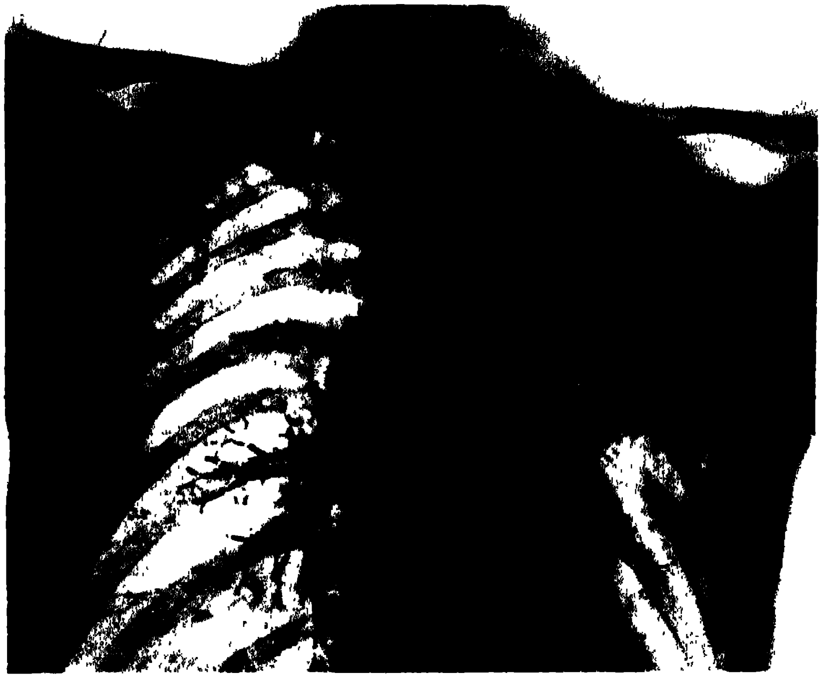

Cut Scalenus Medius M.
Cut Scalenus Anticus M.
Scalenus Posticus M. retracted
Long Thoracic N. retracted
Trapezius M.
Cut Omohyoid M.
Cut Omohyoid M.
Upper, Middle and Lower Trunks of Brachial Plexus Retracted
Sterno-Cleido-Mastoid muscle.
Clavicle
Subclavian A. retracted
Subclavian Groove

Fig. D.—The scalenus medius muscle has been cut, showing the inward and upward curving of the first rib. The long thoracic nerve is retracted. The lines for cutting the first rib, including a nubbin of the lateral process of the 1st thoracic vertebra, are indicated. The actual exposure is fully as good as shown here.

PLATE XV

PRIMARY CARCINOMA OF LUNG

(SIR W. I. DE COURCY WHEELER)



Skiagram of chest before operation, after injection of lipiodol. The tumour is well seen involving the upper lobe of the left lung (right side of illustration).

of a man, age 58 years, with primary carcinoma of the lung removed by the reviewer during the present year. The bronchial tree was injected with lipiodol, which lies for the most part below the tumour on the left side. It was difficult to ascertain by X-ray examination before operation whether the tumour was in the mediastinum or in the lung. At operation in this particular case the growth was found to be adherent to the back of the sternum, to the dome of the pleura, and to the posterior mediastinum. Piecemeal extirpation became necessary. The operation was attended by no special difficulty. The lung below the tumour appeared normal. Microscopically, the tumour was a diffuse primary solid carcinoma of the lung. It was composed of polyhedral cells, and in a few places there was a faint resemblance to squamous cells. A portion of adherent pleura removed with the tumour was infiltrated by the growth.

G. J. Heurer[7] reports 33 cases; 15 were subjected to operation. The operation consisted of a radical removal of the tumour in 9, a partial removal or the drainage of infectious complications in 5. There was one operative death occurring in the group subjected to radical operation. Of the cases subjected to radical operation, 8 recovered, and of these, 1 (benign) is living ten years, 1 (benign) eight years, 1 (benign) six years, 2 (malignant) over two years, 1 (benign) less than one year. Two (malignant) died of recurrence within a year. Of the cases treated by partial removal, 1 lived over two years, the remainder died in about a year. Of the 31 intrathoracic tumours seen by the author, only 11, or 35 per cent, were possibly operable. The mortality in those subjected to radical operation was 10 per cent and the results were not too unfavourable. His experience warrants the assumption that with earlier diagnosis and earlier operative treatment, the surgery of intrathoracic tumours may be greatly improved.

S. W. Harrington[8] reports in detail 16 cases of tumour of the chest, either intrathoracic or parietal. In 11 the tumour was malignant and in 5 benign; in 2 cases of malignant tumour it was intrathoracic. The symptoms are analysed and the diagnosis is discussed. The clinical differentiation of early malignant and benign tumours of the chest wall is difficult. When the diagnosis is doubtful, exploratory thoracotomy is indicated. Early radical extirpation of malignant tumours followed by radiotherapy instituted at the time of or immediately after the operation has given the best results. In cases of extensive disease, partial removal of the tumour followed by the use of radium did not seem to prolong life or relieve the symptoms. Intrathoracic tumours at the apex of the lung may be exposed by cutting the clavicle. Large intrathoracic tumours of the lateral wall of the thorax may be removed by a two-stage operation, in the first stage of which measures are taken to wall off the general pleural cavity by the formation of adhesions between the visceral and parietal pleura around the tumour. **Ethylene Gas** is a satisfactory anæsthetic. It should be used with a positive-pressure apparatus, as in any operation the pleural cavity may be opened. In 6 of the cases of malignant tumour there has been no recurrence and the patients are well from eleven to eighteen months after the radical removal of the tumour. In one case of intrathoracic tumour a small recurrent tumour was removed after six months. In 3 cases death followed recurrence within six months after the operation; all of these were cases of extensive malignant disease in children. There were no operative deaths.

Abscess of the Lung.—This condition calls for co-operation between surgeon and physician in the interest of the patient. J. A. Miller discusses the condition from the medical aspect, and A. V. S. Lambert from a surgical standpoint.[9] Miller states that the primary and basic treatment is absolute bed-rest combined with postural drainage for weeks or months. Cough, with the expectoration of pus, occurs in all cases of lung abscess in which there is a communication of the abscess with the bronchus. The patient is completely inverted, with the head hanging down to the floor, by bending at the waist over the edge of a bed. This posture should be assumed at regular intervals about every three or four hours at first, for from five to fifteen or twenty minutes. Discomfort felt in the head is transitory. Cough and foul expectoration are helped by the administration of **Neosalvarsan.** Spirochætes are frequently found in the sputum. Artificial pneumothorax carries with it too great a risk for routine employment. Brilliant results may be obtained by its use in lesions near the hilum. Operation is indicated if considerable progress towards cure is not made in a month or six weeks. Miller thinks that about 50 per cent of cases eventually come to operation, but preliminary medical care has reduced the surgical mortality to about 10 per cent.

Lambert states that septic foci are usually mistaken at first for pneumonia, and the diagnosis is not completely made until there is free communication with a larger bronchus. The chief essential of successful treatment of lung abscess is drainage. It is important to establish the exact location of the abscess, and if possible the point where it is nearest the chest wall. Gas-oxygen anæsthesia is probably best. If collapse of the lung occurs because of the lack of adhesion the lung may be blown up and the danger of a possible shift of the mediastinum decreased. If no adhesions are present, it is wise to pack the wound with gauze and wait for from three or four days to a week until the two layers of pleura adhere. Otherwise there is the danger of establishing a severe type of empyema. For the same reason an aspirating needle should not be used before operation.

J. P. Anderson,[10] discussing the **Pneumothorax** treatment of lung abscess, states that the prognosis of lung abscess has been universally poor. Of 110 cases not operated upon which were reported by Lord, recovery resulted in 10 per cent, partial alleviation in 15 per cent, and death in 75 per cent. Of the 117 cases in the series which were operated upon, recovery resulted in 15·3 per cent, partial relief in 18·8 per cent, and death in 47·8 per cent. Lord gave pneumothorax a very small place in his treatment, but Anderson characterizes it as a simple and safe procedure which will cure some cases and render others better risks for surgical procedures. Anderson reports the cases of 6 patients treated by pneumothorax, 2 of whom were completely cured, and 4 of whom were greatly benefited and made better risks for operation. Two of these patients developed valvular pneumothorax and pyopneumothorax. One was treated by surgical drainage and recovered. The other, an elderly woman with poor resistance, left the hospital too soon and could not be followed up; her condition was therefore not recognized soon enough and terminated fatally. In another case pneumothorax was beneficial until the development of pneumonia followed by dense adhesions. Surgical drainage was then indicated and was successful. One case of very large abscess was prepared by pneumothorax for thoracoplasty. Anderson concludes that palliative treatment should be tried first, but if it does not result in improvement in a month, some other form of treatment is necessary. When surgery is contemplated the patient's general condition must be considered. The best results are obtained only by close co-operation between the intern, surgeon, and bronchoscopist.

Bronchiectasis.—On a girl, age 16, who had bronchiectasis of the lower lobe of the left lung, and in whom internal treatment had failed, J. H. Zaaijer[11] first performed rib resection with removal of the periosteum and the intercostal musculature. The result was unsatisfactory. Exeresis of the phrenic nerve was then done, but without success. His next procedure was to expose the diseased lower lobe, free it from all attachments except at the hilus, and isolate it with tampons, ready for extirpation or resection at a later sitting. To his surprise, another operation was not necessary; the expectoration stopped entirely and permanently after fourteen days. Tamponade was continued, the lobe became smaller and smaller, the cavity diminished in size, and the skin margins drew ever nearer to the deepest point of the cavity. A röntgenogram shows the lower lobe completely obliterated, and the upper containing air. Clinically the patient is entirely cured. Zaaijer proposes the following sequence of operations for lower lobe bronchiectasis; after any one of them cure may result; furthermore, each one lessens the danger of the following procedure: (1) Exeresis of the phrenic nerve; (2) Extensive rib resection over the disease focus, with removal of the periosteum and intercostal musculature; (3) Intrathoracic isolation of the diseased lobe by tamponade; (4) Incision, resection, or extirpation of the diseased lobe.

Empyema.—The practical points to remember in connection with this malady when acute are: (1) In the pneumococcal forms, which represent from half to two-thirds of all cases, the pus is thick, often loculated, and only aspirated with difficulty. (2) The streptococcal variety represents about a quarter of the cases; the pleural cavity is full of thin pus, and gas-forming organisms produce a pyopneumothorax. (3) All cases of unresolved pneumonia in children are cases of undiagnosed empyemata (Moorhead). (4) In the pneumococcal variety free opening of the chest is safe, but, in the opinion of the reviewer, seldom desirable or necessary. (5) In the streptococcal variety the intrathoracic pressure is high, the intercostal spaces bulge, the mediastinum, diaphragm, and liver are displaced; in this variety free opening of the pleural cavity is exceedingly dangerous; the equilibrium of the thorax is suddenly disturbed, and a condition of flapping mediastinum is produced which frequently is fatal. Such cases must be aspirated several times before drainage.

E. E. Larson[12] recommends **Air-tight Drainage.** This method has been advocated in the MEDICAL ANNUAL—1922, p. 456; 1924, pp. 150 and 153; and 1925, p. 124—and the technique described. Larson summarizes his remarks as follows: "Fourteen patients with acute empyema and one death, a mortality of 7·14 per cent, form the basis of this discussion. The diagnosis of an existing empyema, or the anticipation of this condition, is the most important factor of all. Acute empyema should be treated by simple measures, such as repeated aspirations, closed drainage, thoracotomy later if necessary. Chronic empyema should be treated so as to prevent morbidity and deformity. Expanding the lung to the chest wall rather than collapsing the chest wall to the lung should be emphasized. Employment of a constant suction apparatus to facilitate cavity collapse is of great advantage. I would emphasize the value of irrigation with **Dakin's Solution.** The injection of **Lipiodol** into a cavity is a very effective method of ascertaining the complicating factors which promote chronicity. A high caloric diet is necessary. Blood transfusions are often required. Exercises are important to facilitate lung expansion and secure minimum deformity." (*See also* EMPYEMA, p. 144.)

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CHICKEN-POX.

J. D. Rolleston, M.D.

SYMPTOMS AND COMPLICATIONS.—A. G. Mitchell and E. G. Fletcher[1] give statistics relating to the age, seasonal incidence, recurrences, complications, and leucocyte count of 775 cases. They remark that the number of adults who contract the disease is not sufficiently appreciated. Of the 775 cases, 150, or

19·4 per cent, were over 20 years of age, 118 being between 20 and 30, 26 between 30 and 40, and six over 40, the oldest being 55. [The oldest case seen by the reviewer was in a man of 60; *see* MEDICAL ANNUAL, 1928, p. 82.] Many of these patients had been sent to hospital with the diagnosis of variola, and a few were physicians, nurses, and attendants who contracted the disease in hospital. The greatest number occurred in the winter months. Only 9 patients, of ages from 2 to 21, gave a history of a previous attack. Complications were rare and almost always mild, the commonest being furunculosis and otitis. Only two deaths occurred: one from streptococcus meningitis following furunculosis, and the other in a child who contracted varicella while suffering from tuberculous bronchopneumonia. There was a slight leucocytosis, especially in infants, but no important change in the differential count.

L. A. Eldridge, jun., and T. M. Rivers[2] record a case of varicella in a male child of 13 months complicated by left *otorrhœa* and *bullous impetigo*, the lesions of which contained an organism—*Staphylococcus aureus*—similar to that obtained from the discharging ear. The drum probably ruptured shortly after the onset of chicken-pox, and the organisms in the purulent discharge became spread over the surface of the body. Fresh foci of infection were thus established in the sites most favourable for the growth of the organisms, viz., the medium provided by the chicken-pox lesions. The bullæ appeared only on the sites previously occupied by these lesions, chiefly the skin over the lower part of the abdomen, groins, inner surface of the thighs, and back of the shoulders, which were regions exposed to pressure and irritation from clothes and posture. The condition was cured by painting the lesions with 5 per cent solution of **Gentian Violet** in 20 per cent **Alcohol.**

H. Knauer[3] reports a case of *purpura fulminans* in a previously healthy girl, age 6 years, who on the eighth day of a mild attack of chicken-pox developed extensive purpura of the lower limbs, and shortly afterwards passed bright-red blood from the urogenital tract and rectum. Recovery took place after repeated large transfusions. Scurvy could be excluded as well as thrombopenia. As the number of blood-platelets was normal, Knauer attributes the extensive hæmorrhages in this case to an enormous diminution of fibrinogen. There was complete absence of coagulation *in vitro* with a normal bleeding time.

E. Apert and Mornet[4] report the case of a girl, age 14, who after a mild attack of varicella developed a series of horizontal purplish *striæ atrophicæ* on the right side of the thorax extending from the angle of the scapula to the last rib, as well as a series of similar striæ on the posterolateral aspect of the pelvis. This appears to be the only example on record of unilateral thoracic striæ following varicella, all the other recorded cases having been associated with pulmonary or pleural lesions.

H. M. Jahr[5] records a case of chicken-pox with *extension to the larynx.* The patient was a girl, age 11 years, who during a severe attack of chicken-pox began to suffer from dysphagia and a hoarse cough. There were several vesicles on the anterior pillars and posterior pharyngeal wall. The larynx was generally reddened and congested, and on the left vocal cord two ruptured vesicles were seen. Both vocal cords were slightly œdematous. The throat symptoms lasted four days and disappeared on the fifth day. The dysphagia and cough persisted for two days more. Subsequent recovery was uneventful. Only two similar cases, reported by Marfan and Hallé, one preceding and the other accompanying the eruption, have been recorded. The first case was that of a girl, age 8 years, who on the fourth day of chicken-pox developed hoarseness and dyspnœa sufficiently severe to require tracheotomy. The second was that of a baby who showed swelling of the larynx with confluent patches. Death took place on the seventh day of disease.

PROPHYLAXIS.—W. W. Waddell, jun., and R. Eley[6] allude to the cases reported by Greenthal (*see* MEDICAL ANNUAL, 1927, p. 89), and report 23 cases in which persons exposed to varicella were **Inoculated** against the disease. After a negative Wassermann reaction had been obtained in the donor, the contents of a vesicle which had first been cleansed with boric acid solution and then with saline were removed by a small capillary tube, and the inoculation was carried out according to the method of vaccinating against small-pox. Six gave histories of previous attacks, and in one the history was uncertain. Of the 23 inoculated, 8 showed a successful reaction as evidenced by the formation of a papule, vesicle, and crust at the site of inoculation; 5 cases of frank varicella subsequently developed; 3 more patients showed so slight an eruption that it was classified as vaccinia; and 3 appeared to have been rendered immune. As there was a difficulty in obtaining positive reactions in a large percentage, and several developed varicella in spite of successful inoculation, the method cannot be regarded as successful in preventing varicella in hospitals or other institutions.

The same objection applies to the observations of Ribadeau-Dumas, Wolf, and J. Chabrun,[7] who inoculated 12 children by cutaneous scarifications with the following results, which they classified in three groups. In the first group, consisting of 2 children of eight and ten months, the inoculation was positive. A small vesicle appeared at the site of inoculation on the eighth day, and on the ninth day the eruption became generalized, though there were only about twenty lesions in all, and the temperature was only slightly raised for two or three days. In the second group, which consisted of 3 cases, inoculation did not produce any local lesion, but generalized varicella developed on the eleventh, thirteenth, and eighteenth days respectively. The third group consisted of 7 children who did not present any local lesions or develop varicella later.

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CHILDREN, MEDICAL DISEASES OF. (*See* BLOOD GROUPS IN INFANTS AND CHILDREN; CEREBROSPINAL FLUID IN CHILDREN; ENURESIS IN CHILDREN; FRACTIONAL TEST-MEALS IN CHILDREN; HIRSCHSPRUNG'S DISEASE; INFANT FEEDING, LACTIC ACID MILK IN; POISONING BY 'META FUEL' TABLETS; RHEUMATIC INFECTION IN CHILDREN; RICKETS; ETC.)

CHILDREN, SURGICAL DISEASES OF. (*See* ABDOMINAL INJURIES IN CHILDREN; EMPYEMA; HARE-LIP AND CLEFT PALATE; HEAD INJURIES IN CHILDREN; INTESTINAL OBSTRUCTION IN INFANCY AND CHILDHOOD; INTESTINE, SPONTANEOUS RUPTURE OF, IN THE NEWBORN; INTUSSUSCEPTION; MESENTERIC LYMPHADENITIS; PERITONITIS IN CHILDREN; POST-OPERATIVE FEVER IN CHILDREN; PYLORUS, CONGENITAL HYPERTROPHIC STENOSIS OF; SPINE, TUBERCULOSIS OF; TESTICLE, RETAINED; TUBERCULOSIS OF BONES AND JOINTS; URETHRA, CONGENITAL STENOSIS OF.)

CHOLECYSTITIS AND CHOLELITHIASIS. (*See* GALL-BLADDER AND BILE-DUCTS, DISEASES OF.)

CHOLECYSTOGRAPHY. (*See also* GALL-BLADDER AND BILE-DUCTS; LIVER EFFICIENCY TESTS.)

John H. Anderson, M.D.

The appearance of any new procedure produces a period of optimism during which claims for accuracy are made many of which cannot be substantiated later. This is followed by a swing of the pendulum to the opposite extreme when objections are raised and cases quoted to show mistakes. Lastly the new test settles down and takes its rightful place in its proper perspective. This would seem to be the case with cholecystography, which is gradually passing from the second to the third of the phases outlined above. Technique is being improved, sources of error are being eliminated, and, more important still, a careful analysis of statistics is showing which are the more important and valuable of the so-called positive findings and which are to be regarded with suspicion. Most of what has been said in previous MEDICAL ANNUALS still stands good, but certain points can now be elaborated and gaps in our knowledge filled in as the result of this year's work.

General Technique.—

Substances Used.—**Sodium Tetraiodophenolphthalein** still remains the drug of selection in most instances. B. R. Kirklin[1] has experimented with **Di-iodo-di-ethyl-ether of Di-salicyl-phthalein,** and W. H. Cole, G. H. Copher, and E. A. Graham[2] are convinced of the value of **Phenoltetraiodophthalein** for intravenous use, but do not consider it superior for oral administration. Difficulties of manufacture and the consequent high price of these special preparations keep them out of the reach of most workers. [A preparation known as **Keraphen (Tetraiodophthalophenon)** has given good results at Ruthin Castle, and is valuable in that it can be given in a fluid vehicle.—J. H. A.]

Preparation of Patient and Preliminary Skiagram of Abdomen.—Some preparation of the patient is now general. H. Morris[3] gives a dose of castor oil the night before, but does not regard stay in hospital as necessary. The preliminary screening of the abdomen is essential, and finds a place in almost every clinic. J. F. Brailsford[4] stresses this point in a thoughtful paper, and quotes cases to show its value. He also combines his examination of the gall-bladder with a barium meal, as do many other observers.

Routes and Method of Administration.—The majority of workers prefer the oral route, though Brailsford[4] still gives the dye intravenously, as also do Graham and his co-workers.[2] It must be pointed out, however, that this latter group are endeavouring to combine simultaneous cholecystography and determination of hepatic function, and for this purpose intravenous medication gives the most reliable results. L. J. Lindström[9] uses the oral method as a routine, but has recourse to the intravenous in doubtful cases. The reviewer doubts the wisdom of this, as different standards of denseness of shadow obtain in the two methods, and the change from one procedure to another adds difficulty to interpretation. As previously suggested (MEDICAL ANNUAL, 1928, p. 87), the best results are obtained where the operator keeps closely to the method he has elaborated, and, if a repeated cholecystogram is necessary, it is thought that the second investigation should be carried out under the same conditions as the first. Kirklin[1] makes one strong point in favour of the oral method when he points out that the greatest margin of error of interpretation exists in that group of cases which gives normal cholecystograms but which shows cholecystic disease at operation: "If it is true that better shadows of the gall-bladder can be obtained with the intravenous method . . . I am fearful that the percentage of error represented in these cases might have been still higher with the intravenous method."

There is no radical change from the method of intravenous injection as previously described (MEDICAL ANNUAL, 1927, p. 183). Several variations, however, have been introduced for oral administration. Victor Knapp[8] uses plain gelatin capsules, uncoated, so avoiding the difficulty and expense involved in the preparation of specially coated capsules or pills. He is supported by Kirklin, and both agree that the plain capsule carries no extra risk or discomfort to the patient and is a better vehicle from the point of view of complete absorption. J. H. King and Lay Martin[5] use plain capsules, but give them at 4, 4.30, and 5 p.m., with a light meal (devoid of fats) at 6 p.m., instead of the more usual routine of taking the capsules with or after the special evening meal.

B. Fantus[6] draws attention to the chance of a capsule being brought into contact with an ulcerated condition in stomach or duodenum, and quotes a case of duodenal ulcer where morphia was required to alleviate the pain which followed the ingestion of the capsules. Some patients also have difficulty in swallowing pills or capsules of any kind, and to meet these contingencies he has investigated the possibilities of giving the dye in a fluid form. He considers that the dose generally used is greater than is necessary, and if a small dose be given (less than 2·5 grm. of sodium tetraiodophenolphthalein) in a suitable demulcent mixture, much of the gastric irritation due to excessive alkalinity is avoided. He finds equal parts of cream and water the most suitable vehicle. To avoid precipitation by the hydrochloric acid of the stomach, an alkaline powder is given before the dye and repeated at hourly intervals till the patient sleeps. Diarrhœa, if present, is treated with small doses of opium, and if there is a tendency to vomit, a weak sedative is administered before the dye is taken. He also uses a colloidal preparation made by precipitating the dye in solution by the passage through it of a stream of CO_2 and then adding dilute tragacanth mucilage, sufficient to hold up the fine precipitate thus formed. The resulting mixture " looks like milk, is not offensive to the taste, and is sufficiently well borne by the stomach not to cause emesis. That the solubility and absorbability of the agent has in this manner been increased is shown by the fact that as little as one gramme of the dye gives a shadow in a normal person." H. Morris,[3] following Sproull, gives the dye in a mixture of cream of wheat modified by the addition of white of egg, and claims good results as regards absorption and comfort of the patient. The preparation of tetraiodophthalophenon, known as keraphen, is also given as a fluid, and forms a peppermint-flavoured drink which is quite palatable and appears efficacious.

To sum up, then, the oral method seems more widely used than the intravenous, though the latter has doughty upholders. Sodium tetraiodophenolphthalein is the dye most generally used, and is as a rule given in capsule form. Fluid vehicles are gradually appearing and have much in their favour.

Reactions, Immediate and Remote.—With improved technique unpleasant reactions are getting fewer. Graham[2] speaks highly of the freedom from trouble following phenoltetraiodophthalein intravenously, and Brailsford[4] has seen few toxic effects with tetraiodophenolphthalein given in the same way, though he admits they have not been entirely eradicated. He reports, however, one case of severe shock within fifteen minutes of the venepuncture, which passed off within an hour. By the oral route, ill effects are fewer and less severe, and if a fluid vehicle is used they appear to be negligible. The reviewer's experience with the preparation known as 'keraphen' in a short series of twenty cases supports this.

J. Friedenwald, M. Feldman, and F. X. Kearney[10] have investigated the after-effects of the dye on the liver and kidneys as seen in animals. Working with dogs, they found that tetraiodophenolphthalein given orally does not produce degenerative or necrotic changes in the liver or kidneys, even in massive doses reaching a maximum of 31·6 grm., given within a period of less than two months. C. K. Hsieh,[7] working with the same type of material, found that small doses were safe, but larger doses caused fatty degenerative infiltration, which he regarded as a forerunner of necrosis, in liver, kidneys, and heart. When a comparison of methods was made, he found that with small doses the same result was produced whether the dye was given orally or intravenously. With large doses, however, it was noted that intravenous injection produced more extensive and quicker injury than oral ingestion. As the dose advised for cholecystography is well below the toxic margin, weight for weight, it would appear that there need be no fear of future trouble in this connection. Feldman,[7] after a collective investigation of 18,000 cases in which oral cholecystography had been performed, considers that the results indicate that this method is free from all danger; furthermore, there has been no evidence presented to indicate that any degenerative changes have been produced in liver or kidneys.

Interpretation of Results.—Cholecystography was introduced in 1924, and sufficient time has now elapsed for an attempt to be made to evaluate its use in the diagnosis of gall-bladder disease. In a most interesting paper I. S. Hirsch and H. K. Taylor[11] critically review X-ray diagnosis of gall-bladder disease, from Beck's work in 1900 down to the present day. They point out that in pre-dye days great emphasis was laid on the demonstration of a gall-bladder shadow at an ordinary screening as indicating a pathological gall-bladder, whereas it is now made to " appear that 'no shadow, delayed shadow, and faint shadow' is a diagnostic slogan which comprises the whole truth of the problem of the detection of gall-bladder disease ". They also urge, and quite fairly, that many of the statistics which have appeared in connection with cholecystography and its results are of doubtful value owing to the paucity of the material from which they are derived. After carefully reviewing the criteria on which diagnosis is based, they pass on to what they consider the chief danger in the procedure of cholecystography: " It is this: [The idea] that the greatest value of the examination lies in the study of disturbed function; that the absence of gross pathological lesion in cases found negative at operation indicates merely that organic changes have not as yet appeared; that there is nevertheless present in such cases a disturbance of the physiology which will lead to a certain definite organic change in the gall-bladder; and that such a gall-bladder is properly removed. The danger of such a view-point is evident, the tendency alarming. Are we approaching an era similar to that happily passing in reference to the appendix, when the gall-bladder is to be removed on a dubious pretext ? "

The case for cholecystography is well stated by B. R. Kirklin[1] and G. B. Eusterman.[12] There are many cases where the diagnosis is so certain on clinical grounds that there is no great need to proceed to cholecystography. In a series of 4998 gall-bladders removed on clinical grounds, 96·5 per cent showed definite pathological changes on microscopical examination.[11] It is in these clinically definite or frank cases of cholecystic disease that cholecystography gives its best results. " With few exceptions, cholecystographic diagnoses are the most accurate in cases in which the clinical evidence of disease is most obvious."[12] " In a group of 250 cases in which gall-stones were found [at operation] cholecystography indicated cholecystic disease in 98·4 per cent ", and " in 79 per cent of the 124 cases in which the gall-bladder showed marked disease without stones ".[1] Taking these 374 cases as a whole, we get an accurate result in 91·9 per cent. There are, however, cases that are doubtful clinically, and it is in this group that cholecystography can be of great use provided it is regarded as a servant and not as a master. The knowledge gained from cholecystograms must be given its proper place in combination with the clinical history and physical examination. " The evidence afforded . . . must be carefully compared with the information gained from the clinical studies of the cases under consideration. It is helpful but not absolute."[5]

There are several factors at work in determining the diagnostic use of cholecystography in the clinically doubtful case. As Kirklin[1] points out, we are faced at the outset with a "lack of exact knowledge as to where the line shall be drawn between normal and abnormal gall-bladders, both anatomically and functionally. Much work remains to be done by the pathologist and physiologist before the diagnosis of cholecystic disease by any method can be placed on absolutely firm foundations." Again, even more important is the consideration of the relative value of individual cholecystographic signs. Kirklin summarizes his 506 cases, all of which proceeded to operation, as follows :—

ROENTGENOLOGIC SIGNS	CASES	DISEASED GALL-BLADDER WITH STONES	DISEASED GALL-BLADDER	SLIGHT CHANGES IN GALL-BLADDER	NORMAL GALL-BLADDER	ERROR PER CENT
Gall-bladder invisible ..	244	165	58	10	11	4·6
Faint shadow ..	141	81	40	4	16	11·2
Total X-ray diagnosis of cholecystic disease	385	246	98	14	27	7·1
Gall-stones reported ..	78	75	1	1	1	3·9
Negative (normal response) ..	121	4	26	7	84	30·6

Kirklin concludes that non-filling of the gall-bladder is obviously the most important sign, and while a faint shadow is not as reliable as invisibility, it ranks not far behind. The largest margin of error was found in those cases where the cholecystogram was normal but a diseased gall-bladder was present at operation. M. C. Sosman[1] agrees in the main with this grouping of signs, though in his series a good dense shadow generally indicated a normal gall-bladder. G. B. Eusterman[12] finds about 30 per cent of cases of definite cholecystic disease give so-called normal shadows. In Kirklin's series, 111 cases were considered normal by the surgeon at exploration and were therefore not removed, though twenty-seven of these had been condemned by cholecystography. It should be pointed out, however, that cholecystography is a test of functional behaviour at the time of examination, not of past disease, and, as is known, a gall-bladder may contain stones, have a virtually normal wall, and give a normal shadow. Also had these gall-bladders been removed, pathological changes might have been found that the surgeon could not detect. Sosman states the position succinctly : "It is not fair for the roentgenologist to base his diagnosis on physiology, the surgeon to base his on inspection and palpation, and the pathologist to base his on the microscopic appearance of the gall-bladder." The final analysis on which results should be based is the result to the patient. This is being done in several clinics, and when the results are available will afford valuable evidence as to what data are required to warrant the removal of a gall-bladder.

H. S. Plummer (quoted [1,12]) has drawn attention to a group which reacts abnormally to cholecystography. The patients were asthenic, easily fatigued, were found to have hypotension, achlorhydria or gastric subacidity, and a lowered basal metabolism rate, without, however, showing any signs of hypothyroidism and little or no clinical evidence of cholecystic disease.

Eusterman thinks these cases, in which an invisible or persistent faint shadow was a frequent observation, are better treated with thyroid than surgery, as at operation the gall-bladder appears normal. They may, however, be potential subjects of cholecystitis. Eusterman also described a group with gastric hyperacidity, especially that associated with duodenal ulcer, where the gall-bladder is normal at operation, though cholecystography suggests cholecystic disease. B. B. Vincent Lyon and W. A. Swalen[13] suggest that errors may arise in some cases owing to a temporary blocking of the cystic duct following a local catarrh. The gall-bladder would not be visualized and at operation would appear normal.

Summary.—Sodium tetraiodophenolphthalein is the most widely used form of dye. The oral route is the one most frequently adopted. Simple gelatin capsules are replacing specially coated ones as a vehicle, and reliable preparations which can be used in a fluid form are appearing. If doubt exists the examination should be repeated; opinions vary as to the method of such repeated investigation. Immediate reactions are fewer and less severe, and seem less marked after oral administration. Animal experiments tend to show that the dye is harmless in the dosage generally adopted.

In many cases the clinical picture is so clear that cholecystography is not necessary. The best results are obtained in cases of cholelithiasis. Invisibility of the gall-bladder is the most valuable cholecystographic sign. The greatest number of errors are made by a diseased gall-bladder giving a normal cholecystogram. Definite groups are emerging that apparently give abnormal cholecystograms. Before condemning the gall-bladder as the offending organ, all other data, especially the clinical, must be carefully considered. In the border-line case there is no agreement as to the grounds on which the gall-bladder should be removed.

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CHOLERA.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

EPIDEMIOLOGY.—This aspect of the disease continues to attract attention, and both a summary[1] and the full study by L. Rogers[2] of the incidence and spread of cholera, and the forecasting and control of epidemics, have appeared during the past year. The latter deals with sixty years' records for each province of India, and is illustrated by twenty-one maps and thirteen diagrams, and he concludes that it should be possible in future to foresee every serious cholera epidemic by watching the meteorological records. He advocates the inoculation of pilgrims travelling to and from places of pilgrimage in the endemic areas in years of cholera prevalence in those areas, so as to prevent their contracting the disease and spreading it in their own villages on their return, as the most important prophylactic measure, especially in protecting the larger part of India, where the disease is not endemic, but is frequently introduced with epidemic spread by their own pilgrims returning from journeys to the endemic areas during cholera prevalence.

W. C. Ross[3] discusses the epidemiology of cholera in the Indian province of Bihar and Orissa, where he has had long experience in the sanitary department, and he supports the view of Greig and others that flies play a major part in the dissemination of the disease after it has originated through carriers, but that water is often secondarily infected. Since 1912 he has associated epidemic prevalence with climatic conditions of temperature and humidity, but he thinks these act largely through favouring the prevalence of flies. Overcrowding, contact with cases in houses, contamination of food and water, and bad conservancy favour the disease. He regards segregation of the first cases, and disinfection of their stools, as of great importance in prophylaxis, and he agrees with Rogers that cholera epidemics do not spread from Bengal, as hitherto taught, and that Bihar and Orissa are included in the endemic area.

B. B. Brahmachari[4] thinks that cholera epidemics tend to recur in Bengal periodically, and that the periods are probably five-yearly ones, and that watching the monthly variations from the quinquennial averages gives valuable indications of the likelihood of epidemic prevalence. The same worker[5] has investigated the occurrence of agglutinating and non-agglutinating vibrios in the stools of apparently healthy persons in Bengal with a view to finding carriers, and an examination of 1377 villagers in six months yielded positive results in two contacts of cholera cases and in three unconnected persons, or a total of about 0·3 per cent. On the other hand, non-agglutinating vibrios were found in 13·7 per cent of the people, and in November no less than 37·5 per cent of healthy persons were carriers of non-agglutinating vibrios, although the annual cholera mortality among the people is only about 2 per mille—a very unlikely state if all these organisms are liable to be transformed into cholera vibrios, as has recently been suggested. This work therefore supports the conclusions of Greig, from many years' investigation in Bengal, that non-agglutinating vibrios, other than the para-cholera ones he described, are not cholera organisms. In a further paper the same worker[6] states that he has found in cholera patients, convalescents, and healthy persons, and in tanks used by them, vibrios not agglutinating with typical cholera sera, but doing so with their own antisera, some of which acquired in time agglutinability with standard cholera serum, so he thinks many of these are transformed into agglutinating cholera vibrios.

TREATMENT.—The blood-pressure in cholera has been studied by A. J. V. McDonnell[7] as a guide to treatment, and he lays stress on the value of the pulse-pressure, as represented by the difference between the systolic and diastolic readings. He advises taking observations after every pint of **Saline Infusion** for cholera; for a pulse-pressure of under 20 mm. indicates the necessity of a further injection, but an increase of 4 mm. of mercury in the pulse-pressure over the previous reading is a sign that the infusion should be stopped. Adrenalin chloride is contra-indicated, as it causes a rise of the diastolic pressure. A. S. Dawson[8] reports 80 per cent of recoveries in Burma by a combination of **Essential Oils** orally and injections of hypertonic and alkaline salines. [These results are the same as Rogers obtained without the oils.] S. N. Banerjee,[9] in cases of acidosis with threatening uræmia, found that 2 oz. of 30 per cent **Glucose** solution, and 10 c.c. of 10 per cent **Calcium Chloride** solution intravenously was of value. On the other hand, Tomb's essential oil mixture proved irritant to the stomach, and in some cases suppression of urine unexpectedly followed its use.

The **Bacteriophage** treatment is reported on by F. D'Herelle and R. H. Malone,[10] who investigated 23 hospital cases in Calcutta, and found no bacteriophage in 3 and a feeble amount in 3 more, all of whom died, but strong bacteriophage in 2 rapidly recovering cases, and weak or fluctuating amounts in 13 and 2 more respectively, in whom it finally increased, with recovery in all. Rogers' intravenous salines were also used, and they regard them as rational in prolonging life until the bacteriophage becomes strong enough to overcome the vibrios. Trials of giving active bacteriophage in a few cases in the Punjab gave very promising results, but the villages were rarely reached until after some days, when the cases showed bacteriophage development before treatment, so further trials are indicated. In one instance no more cases occurred after adding bacteriophage to the wells, but the writers recognize that no conclusions can be drawn from one such event. Further work on these lines will be awaited with much interest. W. C. Ross, K. N. Bagghi, and B. C. Roy[11] report preliminary work on similar lines in Bihar in 1924 and 1925, which was interrupted by illness, and they also concluded that there is an active choleraphage directly associated with the natural recovery from the disease, which can be cultivated, and should be tried in the treatment of cholera.

REFERENCES.—[1]*Jour. R.A.M.C.* 1927, Sept., 182; [2]*Ind. Jour. Med. Research.* 1928, March, Memoir 9, 1–175; [3]*Ibid.* 1928, April, 951; [4]*Calcutta Med. Jour.* 1927, May, 525; [5]*Ind. Jour. Med. Research*, 1927, Oct., 361; [6]*Ind. Med. Gaz.* 1927, Nov., 630; [7]*Jour. Trop. Med. and Hyg.* 1927, Dec. 1, 301; [8]*Ind. Med. Gaz.* 1928, April, 204; [9]*Calcutta Med. Jour.* 1927, Nov., 237; [10]*Ind. Med. Gaz.* 1927, Nov., 614; [11]*Ind. Jour. Med. Research*, 1928, April, 965.

CHORDOTOMY. (*See* PAIN, INTRACTABLE.)

CIRRHOSIS OF THE LIVER. (*See* LIVER, DISEASES OF.)

CISTERN PUNCTURE.

Geoffrey Jefferson, M.S., F.R.C.S.

Puncture of the cisterna magna, with the object either of obtaining cerebrospinal fluid or of injecting serum or lipiodol, is a well-established procedure. It was introduced in 1919 by Ayer, of Boston, and has won for itself a firmly established place in the surgical technique of neurology. Ayer published a record, drawn from several sources, of 2000 cases without a death, so that although one new to the method may at first be rather shy of attempting it, it is clear that there is, in careful hands, no great danger in its performance, and the indications for its use are being widened. W. Sharpe and C. A. Peterson[1] give as indications: (1) The treatment of meningococcal meningitis in the presence of spinal block due to adhesions; (2) The treatment of cerebrospinal syphilis, particularly general paresis; (3) The early diagnosis of cord compressions; (4) To obtain fluid when none can be got by lumbar puncture; (5) To irrigate the subarachnoid space in meningitis. Latterly they have been tempted to use it for the injection of air as an aid to diagnosis in cerebral affections, notably tumour. They have performed cistern puncture thirty-six times on infants and adults during the past three years, the patients' ages varying from 16 months to 45 years. Twice they were unsuccessful: in one case the reason was found to be that the cistern had been obliterated, the medulla and cerebellum having been forced down into the foramen magnum (by tumour, presumably); the second failure was due to sarcoma of the upper cervical vertebræ.

In the first case the operators were fortunate to have escaped without inflicting damage, as a case recorded by H. Steindl from Hochenegg's clinic clearly demonstrates.[2] A woman, 48 years old, suffered from severe pain in the right side of the face followed by total paralysis of the right eye. A small tumour was found in the nasopharynx, and this had evidently involved the middle cranial fossa. A right-sided decompression was eventually done, with severe herniation of the brain. A month later, as the pain remained extremely severe, it was thought that withdrawal of cerebrospinal fluid might act as a further, if temporary, decompression. A cistern puncture was attempted, but when the needle had penetrated 3½ cm. a pulsating stream of pure red blood poured out. The patient died next day. At necropsy a medullary carcinoma of the nasopharynx was found to have eroded the skull and invaded the right temporal lobe. A puncture hole was found in the left vertebral artery, which was abnormally lying immediately beneath the occipito-atlantal ligament, distortion of

PLATE XVI

REDUNDANT COLON

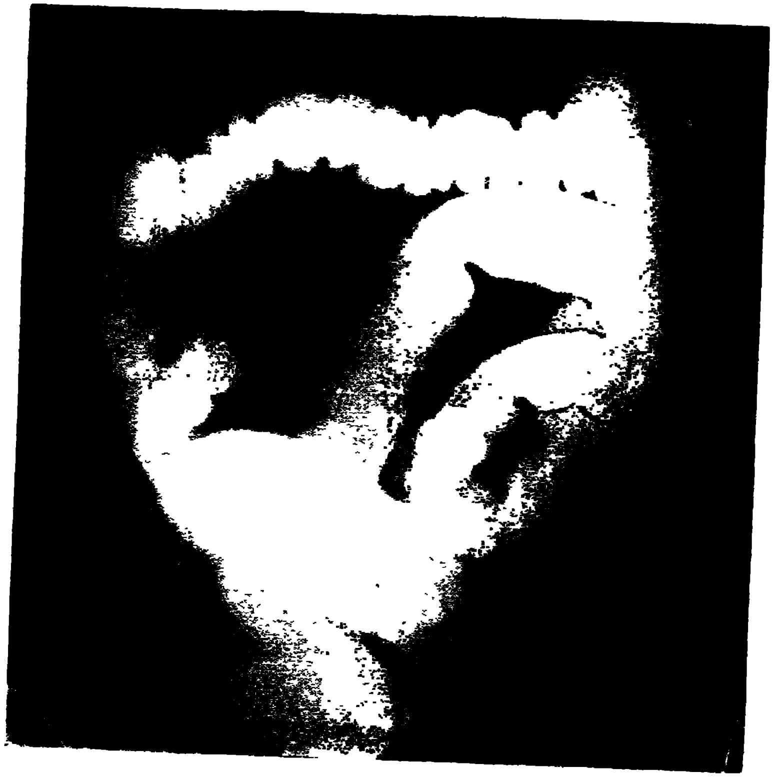

Fig. A. Redundant colon with long sigmoid loop reaching up almost to splenic flexure.

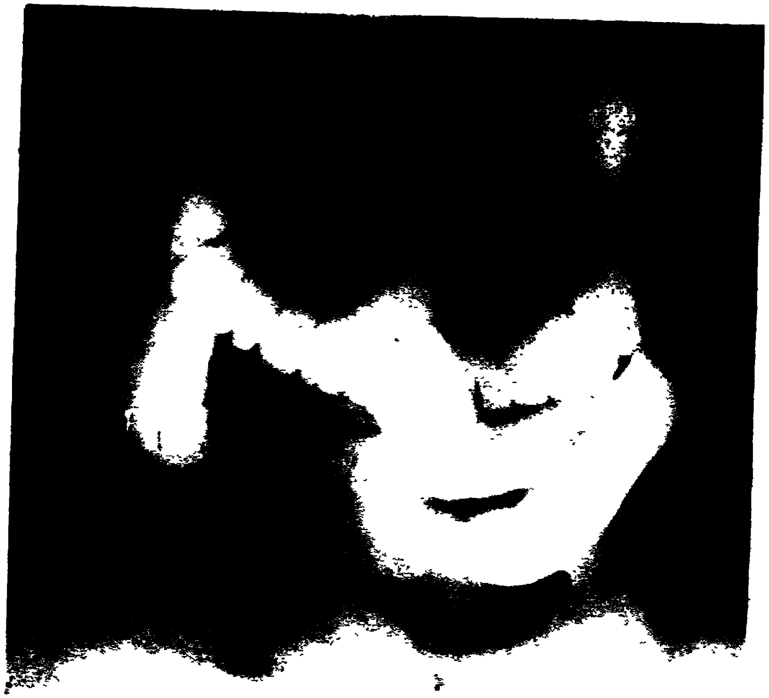

Fig. B.—Redundant colon with very long sigmoid and descending colon loops, one of which passes in front of the transverse colon.

MEDICAL ANNUAL. 1929

Plates XVI and XVII by kind permission of the 'New England Journal of Medicine'

PLATE XVII

REDUNDANT COLON—*continued*

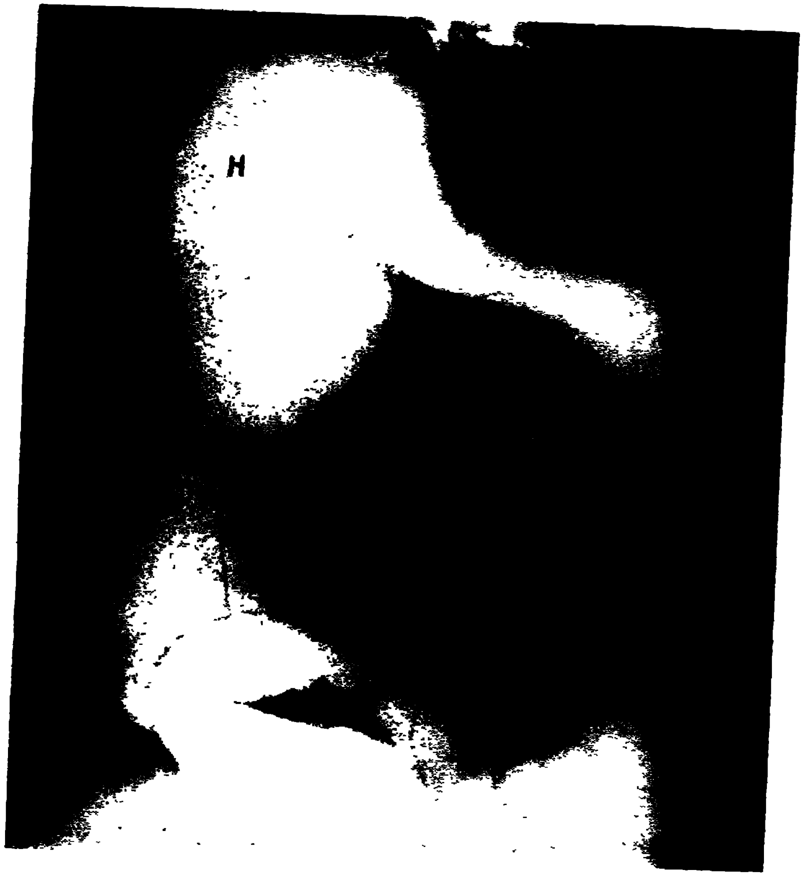

Fig. C.—Redundant colon with very large hepatic flexure (H) and long sigmoid loop which lies in front of caecum.

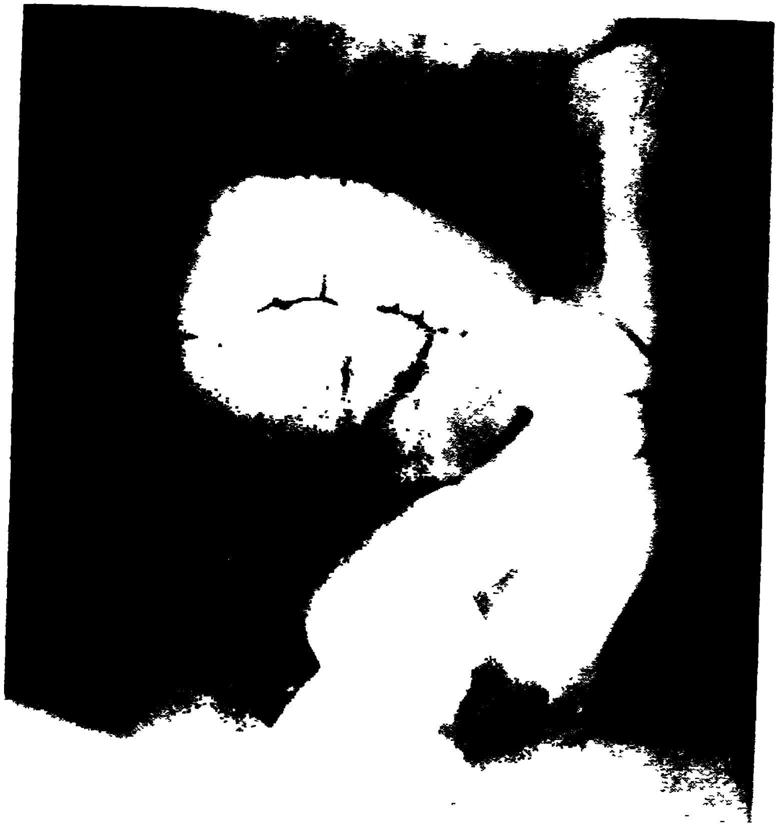

Fig. D.—Redundant colon with long sigmoid loop, long transverse colon, and caecum in mid-abdomen.

the brain-stem having occurred. A contributory cause was the development of a cerebrospinal-fluid fistula at the decompression opening, depleting the cisterna medullo-cerebellaris. Clot surrounded the brain-stem and filled the base of the skull. Steindl refers to another fatality, a case of Nonne's. An arteriosclerotic man of 79 years had a cistern puncture performed upon him. A pulsating stream of blood flowed out of the needle and the patient died within five minutes. At necropsy two sac-like dilatations of branches of the posterior inferior cerebellar artery were discovered, and one had been injured by the needle.

[The writer has heard of another unpublished case (of meningitis) in which death followed the puncture, though the exact site of injury was not established. It is borne in upon us that cistern puncture is not different from other surgical interventions which entail delicate handling, and that quite unforeseeable abnormalities may bring disaster at odd times. These untoward results do not condemn the procedure as unsafe, but they warn us to use discretion and not apply the method unless it is the only one (and it can be so unique) that will give us the information we seek. We should be justified in saying that this puncture should be used sparingly in known cases of intracranial tumour, especially those of long standing and those involving the cerebellum, for we cannot know what rotations and distortions may have occurred in the posterior fossa.—G. J.]

REFERENCES.—[1]*Ann. of Surg.* 1927, Dec., 801 ; [2]*Deut. Zeits. f. Chir.* 1928, April, 97.

CLEFT PALATE. (*See* HARE-LIP AND CLEFT PALATE.)

CŒLIAC RICKETS. (*See* RICKETS.)

COLD, THE COMMON. (*See* NASOPHARYNGEAL CATARRH.)

COLON, REDUNDANT.

Robert Hutchison, M.D., F.R.C.P.

Franklin W. White[1] regards this as one of the most important and interesting anomalies of the colon. It is frequently overlooked. The redundant colon is one which is too long for its owner and is loosely attached, falling into loops and kinks. It is not a question of absolute length ; the colon is simply too long for the individual abdomen. The redundancy may be general, the whole colon fitting the abdomen badly, every part of it being a little too long and too loose ; or it may be local, there being simply a long sigmoid loop, a double loop at the splenic or hepatic flexure, or a very long transverse colon. Over two-thirds of the important loops are found on the left side, in the sigmoid, descending colon, or splenic flexure. Contrary to expectation, the majority of cases occur in males and usually in persons of good physique. The condition is congenital, but is often latent or only causes symptoms from time to time. Under strain, fatigue, infection, or increasing age there is loss of muscular tone, function is interfered with, and symptoms appear. Obstinate constipation is the commonest of these, but pain is not infrequent ; it varies from a mild grumbling to violent colic, and has often led to wrong diagnosis. It may be general or local, and in the latter case is twice as frequent on the left side. Volvulus causing acute obstruction may occur.

DIAGNOSIS.—This can only be made by X-ray examination after a barium enema (*Plates XVI, XVII*), but it is not always easy to draw the line between normal variations in the colon and mild redundancy. Too much importance must not be attached to a sigmoid loop a few inches longer than the average, or an hepatic flexure or a descending colon that is a little wavy. In a few cases very remarkable and variable deformities of the stomach and duodenum are produced by the pressure and pulling of the great colon loops. Diaphragmatic hernia alone can produce similar stomach deformities.

TREATMENT.—This should be medical and not too severe, the aim being to restore normal function. The **Diet** should be bulky and contain plenty of cooked fruit and mashed vegetables. Constipation should be treated by mild **Laxatives** and **Enemata.** **Abdominal Exercises** and **Massage** are useful.

REFERENCE.—[1]*New England Jour. of Med.* 1928, May 31, 783.

COLON, SURGERY OF.

A. Rendle Short, M.D., F.R.C.S.

Megacolon.—R. W. Bolling[1] contributes a sensible article on this difficult subject. He points out that the cases are by no means all alike; true Hirschsprung's disease, in which the entire colon is involved and there is no mechanical obstruction, is relatively rare, and usually commences in infancy or is congenital. Much commoner is the acquired type, associated with some degree of mechanical obstruction, seen in older children or adults, and it may be only involving the sigmoid. The rectum may or may not be distended also. In true Hirschsprung's disease the outlook is poor whatever the treatment, but a careful trial of medical measures is worth while, including an **Abdominal Belt, Enemata** every day, a **Low Diet** with restricted starchy foods, and **Atropine,** but no aperients. If operation is necessary, but the colon is loaded, a colostomy must be done as a preliminary. If the bowel can be cleared, the best procedure seems to be to perform a lateral anastomosis between the ileum and the sigmoid, then divide the ileum and close both ends. Just above the anastomosis the colon is cut across, and a colostomy made of the proximal end. The greater part of the colon is thus left bilaterally excluded, to drain through the abdominal wall. This portion can be removed subsequently if desired. The advantage of all this is that it lends itself to division into stages. When the rectum shares in the distention, medical measures are generally best. The most favourable type of case for resection is when the rectum is normal and only the sigmoid is affected. A resection, in multiple stages, is the best line of treatment.

Ulcerative Colitis.—H. E. Santee[2] gives a general review of the pathology, symptoms, and treatment. In many cases a plump Gram-positive diplococcus, described by Bargen, may be isolated. After describing the symptoms, which are well known, he discusses the sigmoidoscopic appearances. At first the mucosa is red, velvety, and granular, bleeding easily. Then miliary abscesses develop, and soon form small punched-out bleeding ulcers, which coalesce and form larger ones. The lesion nearly always starts in the rectum or pelvic colon. The treatment at first should be medical, but there is a mortality varying in the hands of different physicians from 5 to 14 per cent. The local application of **Acriflavine** has proved helpful. If this fails, the surgical treatment which holds the greatest prospect of cure is an open **Cæcostomy** to drain away all the contents of the bowel and so give rest to the colon. Of 9 cases operated on, 3 died; 4 treated by cæcostomy were all cured. The opening can be closed after six months. J. P. Lockhart-Mummery[3] says that 40 per cent recover under medical treatment. The appropriate method for the others is **Appendicostomy** to allow of irrigation. Of 51 treated medically, 27 were cured, 23 improved, and 1 died. Of 79 on whom appendicostomy was performed, 59 were cured, 12 died, and 8 improved. Naturally the surgical cases were those which were so severe that medical cure seemed improbable. There is an unfortunate tendency to recurrence. It is a common mistake to starve these patients too much. They need a liberal diet.

Diverticulitis.—R. Mailer[4] has had access to the records of the Mayo Clinic dealing with this subject, and gives a study of it. He points out that in 80 per cent of cases the sigmoid is affected, and that the great bulk of the patients are between 40 and 60 years of age. The symptoms fall into no less than six groups: (1) Obstruction cases, 28 in number; (2) Intermittent obstruction attacks, 29 cases; (3) Constipation merging into obstruction, 12 cases; (4) Vesicosigmoidal fistula, 16 cases; (5) Diverticulitis with cancer, 8 cases; (6) A tumour, 7 cases. There may be fever and peritonitis localized in the left iliac fossa. The treatment is medical unless really urgent symptoms arise, when the choice lies between colostomy, and resection with or without colostomy. There was a mortality of 10 per cent, and most of the remaining patients were relieved. J. T. Case[5] gives illustrations of the radiographic appearances of *diverticulosis*, which is in itself harmless, and diverticulitis. He says that the small intestine can be seen to be pushed away from the left iliac region by the fat-laden sigmoid in this disease. H. Lorin and M. Laemmer[6] call attention to the *retroperitoneal abscesses of colonic origin*, which are probably due to diverticulitis. They advise an opening from the loin.

Pericolitis and Epiploitis.—Under these unfamiliar titles a discussion is reported at the French Congress of Surgery at Paris in October, 1927. G. Lardennois[7], of Paris, opened on the former. Pericolitis means practically the development of adhesions, in sheets or in bands, about the colon, and may follow accidents, operation, infections such as appendicitis, or more chronic conditions such as salpingitis. Pericolitis gives rise to deformations of the colon and consequent mechanical difficulties, toxic absorption from the bowel, or even actual obstruction. The preventive treatment is discussed, especially the avoidance of injury to the peritoneal endothelium. If medical treatment fails—the principal item in this being a *long* stay in bed, even up to several months, with **Balneotherapy, Ultra-violet Light,** etc.—an operation may be necessary, but it must be done during a quiet interval, when the leucocyte count is normal. The procedure to be adopted varies; if possible it only entails liberation of adhesions and covering of the raw surfaces by invagination or by free omental grafts, which are known to survive and function well. If this fails or is impossible, an **Anastomosis** may be performed, the only satisfactory one being not ileosigmoidostomy but cæcosigmoidostomy. More often the best course is a right hemicolectomy, which gives good results, as also does excision of the sigmoid.

J. Silhol, of Marseilles, opened on *epiploitis*. This means inflammation and adhesions of the omentum, due to intra-abdominal infections such as appendicitis or salpingitis, injury, tubercle, or syphilis. The condition may be acute or chronic, and the symptoms are those of deformation of the intestines by bands, or vague pains due to the omental adhesions themselves. These are described in considerable detail. Altogether the papers and discussion have a freshness of view which makes them well worth reading.

The term *paracolitis* is employed by Pokryschkin,[8] of Tomsk (Russia), in a rather different sense. He includes under this title a series of cases which were evidently what we should call diverticulitis of the left colon, and appendicitis, having in common the formation of abscesses about the ascending or descending colon.

Cancer of the Transverse Colon.—P. Bertrand[9] contributes a valuable paper describing the modern treatment of this condition in French surgery. The methods described are the following: (1) *Local colectomy without derivation* of the contents of the colon, by removal of the growth and end-to-end or side-to-side or end-to-side anastomosis—Reybard's operation. As the end-to-end union is weak, it may be wise to pack it around with gauze (Chaton, Desgouttes). (2) *Hemicolectomy with ileotransversostomy.* Various incisions are in use; Lecène cuts downwards and inwards from the tip of the eleventh rib in the line of the fibres of the external oblique muscle. Others use a vertical incision. The suture may be made with the help of Villard's or Jaboulay's buttons. Otherwise, a side-to-side union is best. (3) Rarely, a *subtotal colectomy* is done. (4) *Colectomy with derivation by exteriorization.* The growth is freed and brought out of the abdomen, and resected either at once or later. It may be resected at once, with of course a part of the mesocolon containing the lymphatic drainage, and partly united to restore continuity, partly drained exteriorly (proceeding of Volkmann, Bouilly). Or it may be resected at once and the two ends left exteriorized, with a Paul's tube in the proximal loop (proceeding of Hartmann). Or the resection may be postponed (Mikulicz, Quénu). Quénu's operation is rather complicated. The resection is done six or eight days later. The writer comments on the danger of the loop of colon pulling back within the abdomen. (5) *Local resection with precautionary cæcostomy*, which should be large (Desmarest). Or an entero-anastomosis may be made.

Bertrand has made a study of 138 cases, partly from the Lyons clinic, partly from the literature.

MORTALITY OF OPERATION FOR CANCER OF TRANSVERSE COLON.

Operation	No. of Cases	Died	Mortality per cent
Local colectomy (Reybard) ..	53	15	28·30
Hemi- or subtotal colectomy ..	21	6	28·5
Local colectomy with exteriorization	32	7	21·87
Local colectomy with cæcostomy	20	4	20·0
Colectomy with partial gastrectomy	12	7	58·33

It will be seen, therefore, that of the total 138 cases operated on, 30 died, or 28·27 per cent.

To some extent the end-results are available.

After *the Reybard operation*: Of 25 cases followed, 4 soon recurred; 4 recurred later (two, three, and eight years); 16 alive and well (all except 2 over two years, some over six years); 1 got ileocæcal cancer after seventeen years. After *hemi- or subtotal colectomy*: 8 were followed up. Of these, 6 were well from two to ten years. After *colectomy with exteriorization*: Of 18 followed, 3 soon recurred; 15 still alive (all except 4 over two years, 5 over four years). After *colectomy with cæcostomy* or similar: 8 were followed, of which 1 recurred in six months, and the other 7 did well (several over three years.) After *colectomy with partial gastrectomy*: 3 were well upwards of two years. [Literture figures are apt to present a too favourable aspect, because successes are more likely to be reported than failures.—A. R. S.]

Bertrand concludes that the best operation in ordinary is a hemicolectomy; if the patient is too ill, the Mikulicz; if the growth is seriously adherent, cæcostomy followed later by resection. [In our opinion, in the presence of obstruction, the first procedure should be a cæcostomy.—A. R. S.]

Colostomy.—*Plates XVIII–XXI* show the method of performing colostomy in not-urgent cases recommended by C. H. Mayo and C. F. Dixon.[10] The incision is through the external and internal oblique muscles by muscle-splitting in the line of the fibres. The loop of descending colon is brought out and sutured with catgut to the peritoneum. A hole is made in the mesocolon, and first the peritoneum, then a slip of internal oblique muscle, then external oblique aponeurosis, and finally a flap of skin, are sutured to their fellows through the

PLATE XVIII.—PERMANENT COLOSTOMY

(MAYO AND [illegible])

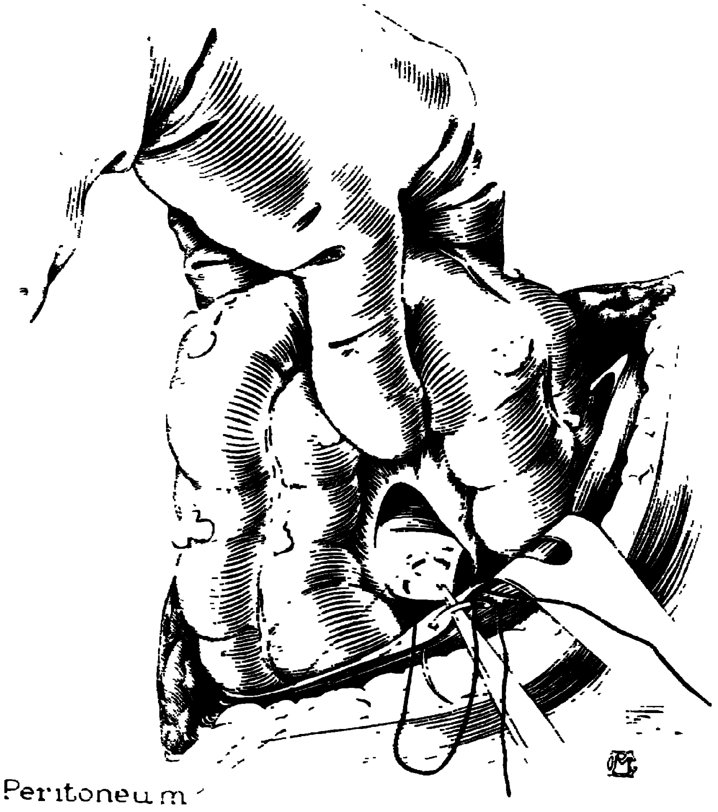

Fig. A.—Incision of mesocolon and method of suturing edges of peritoneum through opening in mesocolon.

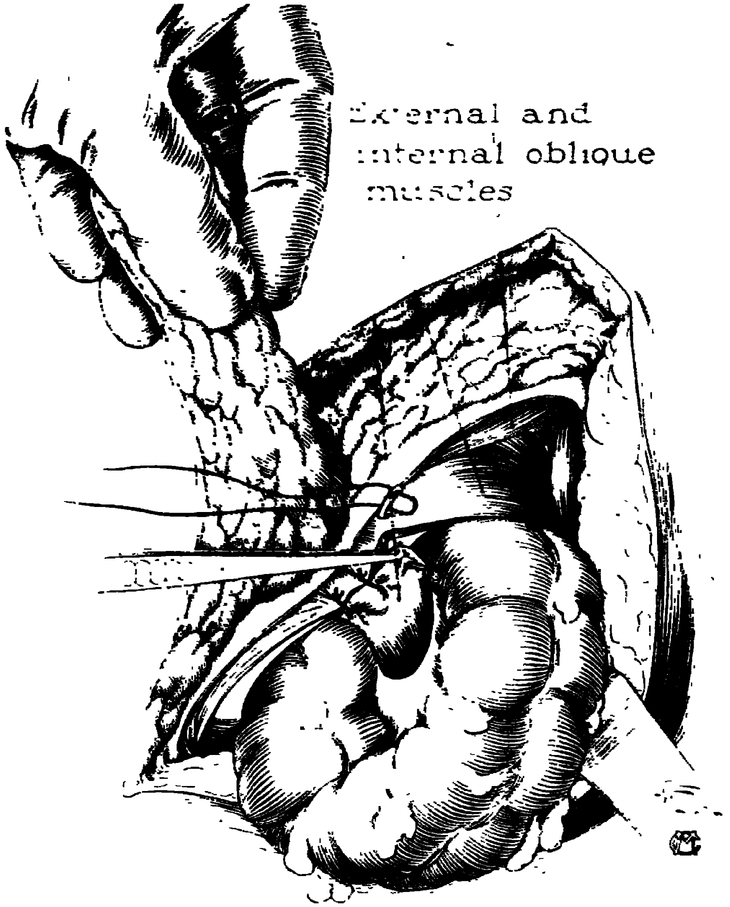

Fig. B.—Flap of internal oblique passed through opening in mesocolon for suture. The skin flap is shown ready for subsequent use.

Plates XVIII–XXI by kind permission of 'Annals of Surgery'

PLATE XIX

PERMANENT COLOSTOMY—*continued*

(MAYO AND DIXON)

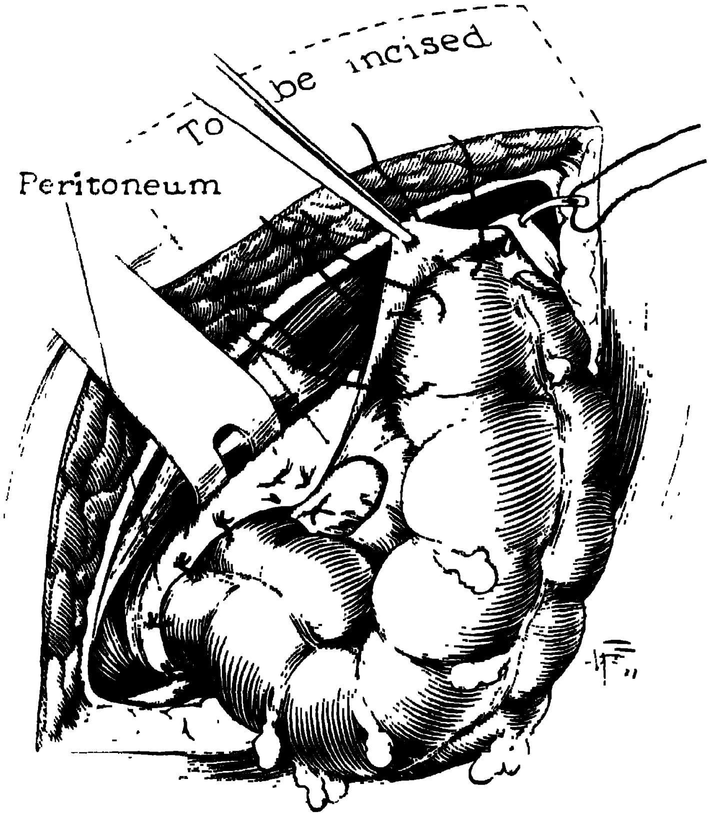

Fig. C. Remainder of peritoneum being sutured to sigmoid.

PLATE XX

PERMANENT COLOSTOMY *continued*

(Mayo and Dixon)

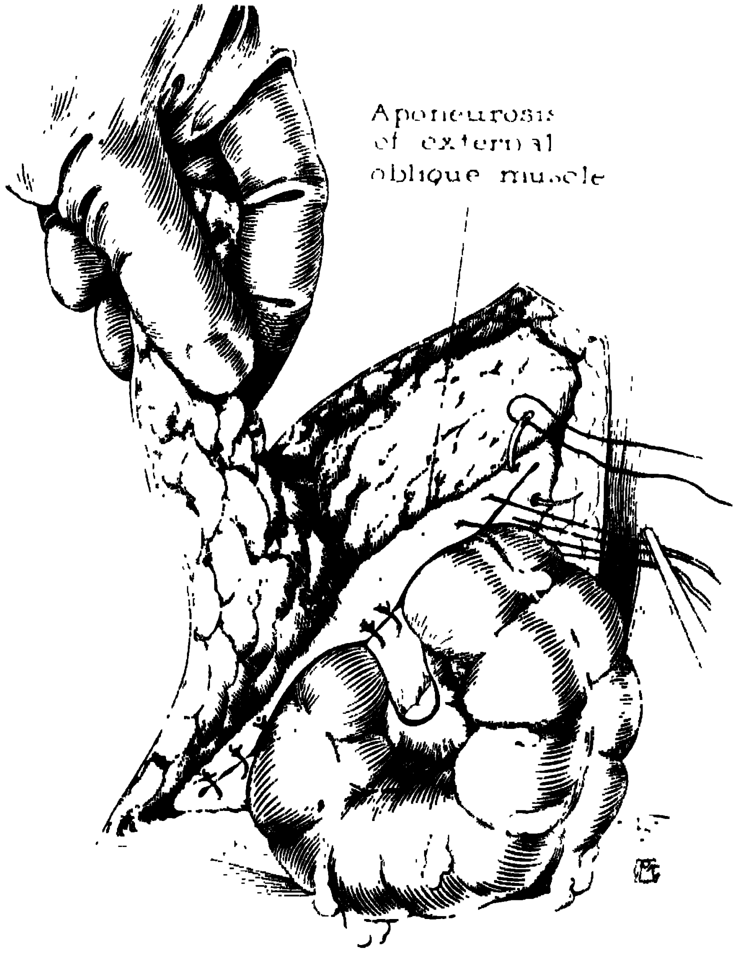

Fig. D.—The external oblique has been sutured through the mesenteric opening and is being closed throughout. The skin flap is held in readiness for the next manœuvre.

PLATE XXI

PERMANENT COLOSTOMY *continued*

(MAYO AND DIXON)

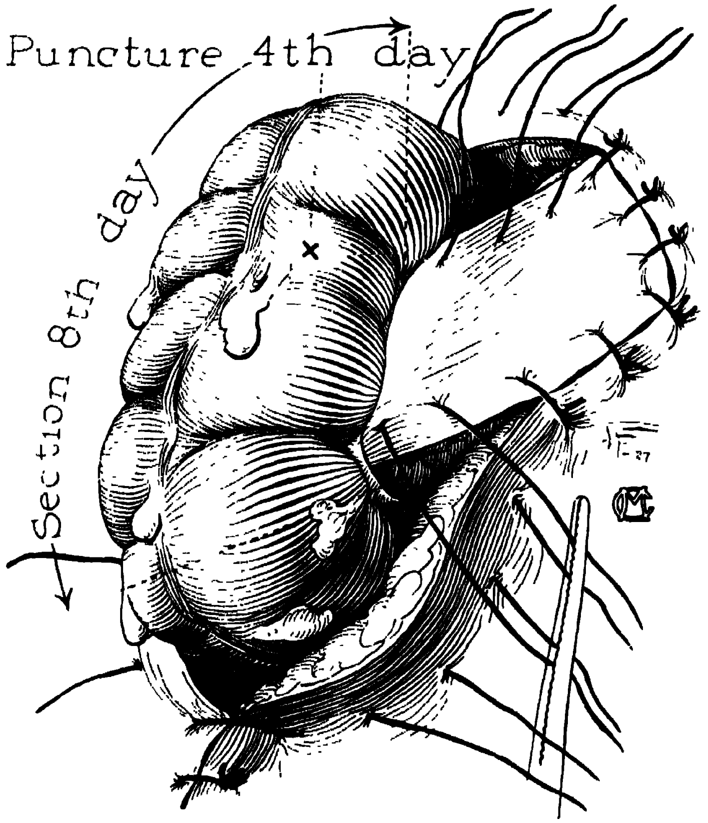

Fig. E. Proximal loop displaced and skin flap sutured.

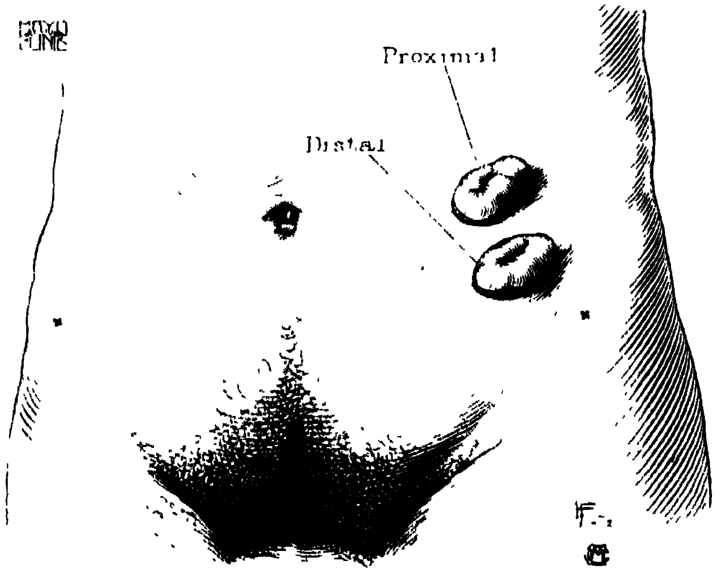

Fig. F.—Appearance after resection of loop.

orifice. The protruding bowel is opened on the fourth day and divided on the eighth. The separation of the openings makes it impossible for fæces to pass into the lower segment of colon, and the muscle-slip helps to give good control.

REFERENCES.—[1]*Ann. of Surg.* 1927, July, 62; [2]*Ibid.* 1928, May, 702; [3]*Lancet*, 1928, i, 1043; [4]*Ibid.* ii, 51; [5]*Amer. Jour. Surg.* 1928, June, 573; [6]*Presse méd.* 1927, July 20, 913; [7]*Ibid.* Oct. 1927, 1204, 1220; [8]*Nowaja Chir.* 1927, No. 5, 475; [9]*Lyon Chir.* 1927, Sept., 506; [10]*Ann. of Surg.* 1928, May, 711.

CONCUSSION. (*See* HEAD INJURIES.)

CONGENITAL DEFORMITIES OF BONES AND JOINTS. (*See* BONE AND JOINT DEFORMITIES, CONGENITAL.)

CONGENITAL STENOSIS OF PYLORUS. (*See* PYLORUS.)

CONGENITAL STENOSIS OF URETHRA. (*See* URETHRA, CONGENITAL STENOSIS OF.)

CONJUNCTIVA, DISEASES OF. *Lt.-Col. A. E. J. Lister, I.M.S. (retd.).*

Experimental Production of a Trachoma-like Condition in Monkeys.—H. Noguchi[1] gives further details of his work referred to in the 1928 MEDICAL ANNUAL, p. 96. It deals with the bacteriology and pathology of the subject, and must be read as a whole. A. F. Macallan,[2] in commenting on this paper, says: "The evidence in favour of the relation of the micro-organism in question to the human disease with which it is associated is found in (1) its association with four of the five cases so far carefully studied, (2) its ability to produce a chronic granular conjunctivitis which closely resembles in its clinical and histopathological aspects the human disease, and also the experimental disease described by previous investigators who have directly transmitted trachoma to monkeys, (3) the transmissibility in series of the experimental conjunctival disease, (4) the recovery of the microbe from the experimental lesions, even in the second and third passage to monkeys, and (5) the total inability of any of the other micro-organisms isolated from the same cases to induce follicular lesions of the conjunctiva of the monkey. Whether the parasite is related to trachoma other than that occurring in American Indians has still to be investigated. It would appear that the organism is a Gram-negative aerobic bacillus, possessed of mobility, which lasts for thirty days in culture. All Noguchi's work has been verified by Verhoeff at the Rockefeller Institute.[3] It appears that the research bacteriologist to the Metropolitan Asylums Board in London has so far not been able to isolate the Noguchi organism. M. S. Mayou[4] suggests there may be more than one form of infection which causes the disease, as there are certain differences in the histopathology of the trachoma of the North-American Indians and that of Europeans. [Though fortunately trachoma is little seen in England, it is the commonest eye disease in many countries, hence anything about its etiology is of interest to workers abroad.—A. E. J. L.]

The Prevention of Blindness in certain Severe Cases of Trachoma by Means of a Celluloid Shield placed under the Upper Lid.—The heading indicates the chief idea in an article by Professor R. Katz[5] (Leningrad) on this subject. Ophthalmologists in Siberia evidently have to deal with severe cases of trachoma who cannot stay long for treatment—a state of affairs very common in the East. This treatment is used by one of them. It was suggested by the following case: A business man demanded some *palliative* treatment for his trachoma as epilations did not relieve him from the irritation caused by trichiasis, which started again twenty-four hours later. Operation was refused (1) because he feared it, and (2) because he had seen it fail to give relief in the case of a friend, though twice repeated. He had a bad trichiasis of the upper lid, which was full of the roots of fine hairs; trachoma with slight pannus was present. [The author does not state the stage, but presumably it was an old scarred case.—A. E. J. L.] The author inserted under each lid a curved shield of thin celluloid, shaped like the under surface of the upper lid and projecting a little in front of the border of the lid. The patient soon said there was no rubbing (frottement). As a matter of fact, the eyes began to settle down, instead of being, as might be thought, irritated by the shield, and lachrymation ceased gradually. After staying a couple of hours after insertion at the author's house, the patient departed wearing the shield. Two months afterwards he returned. The entropion had considerably diminished, so that he could himself insert the shields, and the pannus had cleared up so that the vision had improved from 0·2 to 0·5 in one eye, and to 0·7 in the other. The author describes another case, and concludes by saying: "The use of a celluloid shield is as good as transplantation of mucous membrane in the treatment of pannus trachomatosus".

[Space does not admit of a discussion of this measure, which the reviewer does not remember to have seen advocated before. It would only be used by those skilled in the treatment of trachoma, and in a limited class of cases only, even by them. The reviewer, however, with a large experience of trachoma, can see, though fully cognisant of its drawbacks and dangers, that it might in certain cases be very useful as a palliative measure. A painless measure which gave even a little relief might be of great value in gaining the confidence of a nervous or delicate patient. He has therefore given some details of this method of treatment, in view of the importance of trachoma to many workers in the East.—A. E. J. L.]

Treatment of Pannus Trachomatosus by Injection of Cyanide of Mercury.—O. B. Ribno[6] has treated 137 cases of trachomatous pannus by subconjunctival injections of **Cyanide of Mercury.** After anæsthetizing the eye by 2 per cent cocaine, by instillation, a subconjunctival injection is made of a few drops of 1 per cent cocaine. Some minutes later, a few drops of a mixture of 1 per cent cyanide of mercury and 1 per cent cocaine is made subconjunctivally at a distance of 3 mm. from the cornea. The injections thus made are painless. In fifty-eight cases of recent pannus a single injection was sufficient to make it disappear. In older cases two or three injections were required to effect a notable improvement. The author recommends this treatment as giving surer and quicker results than the usual therapeutic measures employed. [So far as the reviewer knows, this method of treatment was first suggested many years ago by Lieut.-Col. Henry Smith. He used, however, a weaker solution, acoin locally, and morphine subcutaneously, as it caused much pain. The reviewer has used it. Russian patients may be less sensitive, but he found even much weaker solutions very painful. The real treatment of pannus in trachoma is to cure the trachoma, but in certain cases injections of cyanide of mercury yielded very striking results, and it is worthy of trial in some cases.—A. E. J. L.]

Prophylaxis of Ophthalmia Neonatorum.—S. Ternatola[7] adds yet another warning to those given by others as to the danger in inexperienced hands of Credé's method of using 2 per cent **Silver Nitrate** in these cases. He recommends: (1) Cleansing of the lids immediately with sterile water and sterile swabs; (2) Care to be taken that none of the bath water should come into contact with the eyes; (3) Immediate notification of any suspected case of infection to the local sanitary authority. [See MEDICAL ANNUAL, 1927, p. 96, in this connection. The use of a 1 per cent solution of **Mercurochrome** is advocated by some writers, and it appears to be useful and not to cause damage to the cornea.—A. E. J. L.]

REFERENCES. [1]*Jour. Amer. Med. Assoc.* 1927, ii. 739: [2]*Brit. Jour. Ophthalmol.* 1928, Feb., 102; [3]*Jour. Amer. Med. Assoc.* 1927, May (abstr. *Brit. Jour. Ophthalmol.* 1928, 103); [4]*Brit. Jour. Ophthalmol.* 1928, March, 169; [5]*La Clin. Ophtal.* 1927, 543; [6]*Rousski Ophtal. Jour.* 1926, No. 1 (abstr. *Rev. gén. d'Ophtal.* 1927, Jan. 20); [7]*Boll. d'Oculist.* (abstr. *Rev. gén. d'Ophtal.* 1927, Jan. 20).

CORNEA, DISEASES OF.

Lt.-Col. A. E. J. Lister, I.M.S. (retd.).

Etiology and Treatment of Hypopyon Ulcer (Ulcus Serpens).—That this subject is a very important one is obvious from the fact that it was chosen as the chief subject for discussion at the Annual Meeting of the Ophthalmological Society of the United Kingdom. Those interested will find a full account in the *Transactions* of the Society for 1927, p. 24. Briefly, almost every possible form of treatment found its advocates. Among the new methods, **Chauffage** was advocated by several speakers of large experience. This was used in various ways, from the old-fashioned hot dry compress to heat applied by the electric cautery (for details of this method see MEDICAL ANNUAL, 1927, p. 99). Chauffage was said by E. Stevenson to be useless in ulcers caused by the diplobacillus. Hypopyon ulcers when recognized should be sent to an ophthalmic surgeon as soon as possible.

Prevention is the thing to aim at, and therefore special attention is called to the following abstract of an article by K. Heesch[1] on this point. He says numbers of eyes are lost every year by pneumococcal ulcers in Germany. Apart from eyes actually lost, many are permanently or temporarily damaged, with corresponding loss of time to the worker and expense to him or to the community. The matter, therefore, he considers, is of importance to the general public. He says that in a certain district in 1901, of 55 injuries to the eye seen in connection with workmen's insurance, 33 resulted in hypopyon ulcer, or 60 per cent. He points out that over one hundred authors have testified to the specific action of **Optochin** in pneumococcal infections since it was discovered by von Morgenroth. Since 1923 Professor K. Stargardt, Director of the Eye Clinic at Marburg, has had every case of injury to the eye treated, after the usual cleansing, by introducing into the conjunctival sac some *fresh* 1 per cent optochin hydrochloride ointment. The best protection against the pneumococcus is an intact cornea, but if this be injured the optochin ointment protects it from infection during the time required for healing. It is very striking to note that out of the large number of 800 cases treated for injury since 1923, only one developed hypopyon ulcer, and that *was one in which by an error boric ointment was used instead of optochin.*

S. H. Browning,[2] of the Moorfields Eye Hospital, says that Axenfeld found pneumococci in fifty-five out of eighty cases of hypopyon ulcer, the other cases being due to the diplobacillus of Morax-Axenfeld. He does not think, however, that the proportion of diplobacillary infections, which works out at 31 per cent, is nearly so high in his own experience.

[It would seem, therefore, that the use of optochin in England is supported by bacteriological findings. Seeing what very dangerous cases these are, practitioners who see eye injuries in colliery districts and in remote places might well adopt the simple precaution used with such signal success in the Marburg Clinic, bearing in mind, however, that not every case of hypopyon ulcer is due to the pneumococcus.—A. E. J. L.]

The Etiology of Conical Cornea.—Conical cornea is of special interest to physicians, as their aid is, or should be, invoked in all cases. G. Weill[3] gives a careful and concise account of the literature. In Strasburg 0·7 case per 1000 were seen in the Eye Clinic there. The proportion varies enormously in different clinics from about 1 per 1000 to 1 per 35,000. The general conclusion to be drawn from the evidence is that the condition is associated with endocrine disturbance. Siegrist, of Berne, attributed it to hypothyroidism exclusively in his work published in 1912. Other observers have on the one hand supported Siegrist, whilst on the other it has been denied that internal secretion plays any part in the condition. Terson gives a brief summary of thirty-three cases. Out of these, four were priests and seven were sisters of charity, all under a vow of chastity. It was only possible to give the results of a general examination in eight cases. In one only of these was it negative, in the other seven affections due to troubles of internal secretion were seen. These were chiefly such as are found in hypothyroidism. Twenty-two of the cases were in women. The author thinks that the high proportion of priests and nuns is not accidental, but due to some endocrine influence the result of some hormonal defect. [The condition is often so appalling that any further light is welcome. There is obviously need for further investigation. Fuchs has recorded that in the course of pregnancy the condition has made peculiarly rapid progress each time that pregnancy has occurred.—A. E. J. L.]

Keratitis caused by Mumps.—L. Detroy[4] says that while a number of eye complications are said to have occurred with mumps, such manifestations as iritis, iridocyclitis, and paralysis of accommodation must be accepted with reserve. He reports a case in which failure of vision occurred simultaneously with the affection of the parotids, and disappeared without leaving any trace simultaneously with the cure of the parotids. The condition was one of parenchymatous keratitis. The cornea presented a sort of trellis-like appearance caused by a series of opaque lines running criss-cross vertically and horizontally through the cornea, which was also opaque but less so than these lines, which therefore stood out. Vision was reduced to perception of light only. Seventeen days later the vision had returned to normal. J. Biggam,[5] seeing a notice of the above case, reports a very similar one, which also cleared up completely. [Practitioners who see mumps will like to hear of these cases. They should, however, be guarded in their prognosis, as it is always possible that a case of syphilitic interstitial keratitis may develop during the course of mumps.—A. E. J. L.]

Treatment and Cure of Carcinoma of the Cornea by Roentgen Rays.—Rados and Schinz[6] state that a carcinoma of the cornea was cured by **X-ray Therapy.** They say that 150 per cent H.E.D. can be applied to the human eye without producing a reaction. The retina stands 33 per cent H.E.D. at a sitting, which is more than the dose necessary for castration. The carcinoma was cured with a dose of 150 per cent H.E.D.

Corneal Transplantation for Relief of Corneal Opacity.—This subject never fails to be of interest. R. Stanka[7] says that of 50 cases operated on to improve vision at Prague, in 9 the transplanted tissue remained clear, in 13 translucent, and in 21 it healed with opacity; in the remaining 7 the transplant would not heal in place. After a bacteriological examination of the eye to be operated on and the eye about to be removed, a disc is cut from the latter with a Hippel's trephine, and the disc is then fixed in position by sutures which pass through the conjunctiva above and below 2 mm. apart.

References.—[1] *Münch. med. Woch.* 1927, Oct. 7, 1701; [2] *Trans. Ophthal. Soc. U.K.* 1927, 38; [3] *Ann. d'Oculist.* 1927, 668; [4] *La Clin. Ophtal.* 1926, Sept. (abstr. *Brit. Jour. Ophthalmol.* 1927, July, 356); [5] *Brit. Jour. Ophthalmol.* 1927, Nov., 596; [6] *Arch. f. Augenheilk.* 1922, cix, 370 (abstr. *Ann. d'Oculist.* 1928, Feb., 153); [7] *Arch. f. Ophthal.* 1927, 335.

CORONARY ARTERY DISEASE. (*See* Angina Pectoris and Coronary Artery Disease.)

CORONERS' CASES AND MEDICO-LEGAL WORK.

Joseph Priestley, B.A., M.D., D.P.H.

Coroner and Medical Status.—Inquiries were made by a coroner into a case of sudden death within a few minutes of the patient's being admitted into an institution, to which he had been sent from another institution, suffering from cerebral hæmorrhage. It was admitted that the removal of the patient might have increased the cerebral hæmorrhage, due to the shaking of the ambulance, etc. The verdict of the jury was 'death from natural causes', and absolved the house surgeon, who certified for removal, from blame, but suggested that confirmatory certification in such cases should be required. The institution concerned (a hospital) was communicated with, but the governors were very decidedly of opinion that such 'confirmatory certification' would be a reflection upon hospital or institutional medical officers (duly and properly qualified as required by the General Medical Council) as compared with outside medical practitioners.

It is clear that no coroner or any other legal authority has a right to decide whether this or that medical practitioner is duly qualified, after being certified to be so by the General Medical Council. In addition, it is to be remembered that the medical officers of an institution, like other officers, are selected after due consideration of their qualifications and ability by the governing staff.

Coroners' Rights to Dispense with Inquests.—The Coroners Act, 1926, gives coroners the right to dispense with inquests in certain cases, whether or not post-mortem examinations have been conducted—in the former cases the coroners certifying the deaths to the registrars, and in the latter the medical practitioners in attendance. This is as the law stands at present, and neither coroners nor medical practitioners can with dignity, or legally, repudiate their respective responsibilities unless and until the law is altered. There is much to be said in favour of the view that, in all cases where post-mortem examinations are considered necessary, public inquests should be considered to be equally necessary. In this connection, however, it must not be forgotten that the safeguarding clause of Section 21 of the Coroners Act, 1926, is far-reaching, in that it lays down that the new provision shall not be construed as authorizing a coroner to dispense with an inquest in any case where there is reasonable cause to suspect that the deceased had died either a violent death or an unnatural death, or had died in prison or in certain other special circumstances.

Coroners and Juries.—The Divisional Court is jealous of any departure from, or irregularities in connection with, coroners' legal duties as set up by the Legislature. Recent legal cases may be cited as follows: (1) The coroner had entered the jury's retiring-room—inquest quashed. (2) The jury's finding being uncertain or *ultra vires* (i.e., not warranted by the facts before the Court) — inquest quashed. (3) The coroner did not view the body—inquest quashed. [N.B.: This was prior to the passing of the new Coroners (Amendment) Act, 1926.]

CRAMP, WRITER'S. (*See* NEUROSIS, OCCUPATION.)

CREEPING ERUPTION.

A. M. H. Gray, M.D., F.R.C.P., F.R.C.S.

In the MEDICAL ANNUAL for 1927 attention was called to some investigations of Kirby-Smith, Dove, and White on a large number of cases of creeping eruption which they had observed in the Southern States of America and which they attributed to the larva of a nematode worm provisionally called *Agamonematodum migrans.* The adult worm was not, however, discovered. G. F. White and W. E. Dove[1] have made further investigations on similar cases, and find the parasite is the third-stage larva of one of the dog and cat hookworms, *Ankylostoma braziliense*. The demonstration was accomplished in the following way: (1) Third-stage nematode larvæ were recovered in five out of forty-eight skin excisions from serial microtome sections; (2) Cultures of infected nematode larvæ were taken from the fæces of the dog and the cat, examined in a locality where and when there was a high incidence of the creeping eruption; (3) These larvæ were applied to the human skin, and the advancing linear lesions of creeping eruption were thereby produced; (4) At autopsy on these dogs and cats only two species of worms having third-stage larvæ were present (these were dog and cat hookworms recognized morphologically as *Ankylostoma braziliense* and *A. caninum*); (5) Characteristic lesions of creeping eruption were produced when larvæ from pure cultures of *A. braziliense* were applied to the human skin; (6) Such lesions were not produced when pure cultures of *A. caninum* were similarly placed on the skin.

REFERENCE.—[1]*Jour. Amer. Med. Assoc.* 1928, i, 1701.

DEMENTIA PARALYTICA.

Sir James Purves-Stewart, K.C.M.G., C.B., F.R.C.P.

Malarial Treatment.—The value of pyrexial treatment of neurosyphilis, and especially of paralytic dementia, is now generally recognized, although we must always remember that it is an empirical and not a specific treatment. It has now been employed, both in Europe and America, sufficiently long for us to make a fair estimate as to the ultimate fate of patients submitted to this treatment. The consensus of experience is that a considerable proportion of general paralytics who would otherwise have progressed to a fatal issue have secured remissions of their symptoms sufficient to justify their discharge from mental hospitals and even to resume their ordinary avocations.

H. A. Bunker and G. H. Kirby,[1] of the New York State Psychiatric Hospital, record their results in a series of 93 male patients with general paralysis who received malarial treatment prior to December, 1925, and who survived their course of fever therapy. Of these, 10 died within two to eleven months, i.e., 11 per cent, as compared with 58 per cent of untreated general paralytics. Of the remaining 83 patients, whose period of observation up to the time of publication (June, 1927) ranged from one and a half to four years, 3 have died, during the second, third, and fourth years respectively. Thus 88 per cent of the total 93 patients have already exceeded the period of one and a half years which is the average expectancy of life in male general paralytics in the New York State hospitals. Of 10 'unimproved' patients treated between three and four years ago, 6 are still alive and 5 of them have manifested no physical or mental regression whatever, suggesting that the disease has become arrested. Of 16 full remissions, none of whom received any supplementary antisyphilitic treatment, 14 have maintained their improvement for more than three years, and 7 for more than three years and a half.

As regards the *technique of malarial treatment*, various observers have recorded numerous modifications and refinements which in their experience have proved useful. Wagner von Jauregg's original method of subcutaneous inoculation has been superseded by that of direct intravenous inoculation from patient to patient whenever possible. In this way the incubation period is shortened from seven or eight days down to five days or less. Inoculated malaria, even from a benign tertian strain of parasite, frequently fails to develop the typical tertian malaria, and often, in general paralytic patients at any rate, shows a daily (or double tertian) febrile attack. According to F. Stumpfl,[2] from von Jauregg's clinic in Vienna, only 7 per cent of general paralytics exhibited a pure tertian fever after malarial inoculation, whereas in tabetics the proportion was 23 per cent. These figures are based on a series of over 1000 cases treated in the course of eight years from 1919 to 1926 inclusive. Most physicians come across occasional cases in general paralysis which appear resistant to malarial inoculation, even when repeated several times in succession. In such cases intramuscular injections of protein, e.g., milk or casein, sometimes liberate the malarial fever, which then runs its usual course.

There are also certain patients who stand malarial treatment badly, especially elderly patients and those with organic disease of the heart, liver, or kidneys. Moreover, optic atrophy may become aggravated by malaria. In such individuals it is prudent to use a modified or mitigated treatment, so as to diminish the intensity of the febrile attacks and also to reduce the number of febrile paroxysms. Jauregg's method in elderly patients is to split the course into two stages. The patient is allowed to have four febrile attacks, which are cut short by quinine in the usual way. Then, after several weeks' interval, during which salvarsan is given, a fresh inoculation of malaria is given, followed by four or more febrile attacks. Another method, described by H. Horn and A. Kauders,[3] also of Jauregg's clinic, is to administer quinine in very small doses (1½ to 3 gr.) so as to control any undesirable violent febrile reaction. A third method is specially useful in cases where, in view of complications, even a single fresh attack of fever is deemed unwise and yet the possibility of its resumption after a suitable interval must be kept in mind. In such a case, after the first febrile attack, 7½ gr. of quinine are given by the mouth, immediately after, not during, the attack. Horn and Kauders strongly recommend the method of small doses of quinine, as little as ¾ gr., given every other day from the date of the original inoculation. In small doses like this, quinine does not prevent the development of the malarial parasite, but the resulting febrile paroxysms do not rise above 40° C. (104° F.) at the most. Once the fever sets in, the small doses of quinine are only given when the temperature has already passed its highest point. The annexed chart from a patient with tabetic optic atrophy (*Fig.* 9) exemplifies the method. If, on the other hand, the febrile paroxysm tends to be abnormally shortened and the temperature shows a tendency to the subnormal, the small dose of quinine is reserved for alternate attacks, as seen in the sixth and seventh paroxysms shown in the diagram. In the particular case from which this chart is taken the seventh paroxysm was higher than the others and attained the unwished-for maximum of 40·4° C. (104·8° F.). It is suggested that the most dangerous period of malarial treatment is during the earlier paroxysms, and for this reason the tiny doses of quinine are commenced during the period of incubation. Patients treated in this fashion do not have their malarial fever interrupted, but only mitigated in severity, and it is claimed that the results are equally efficient, so far as the paralytic dementia is concerned.

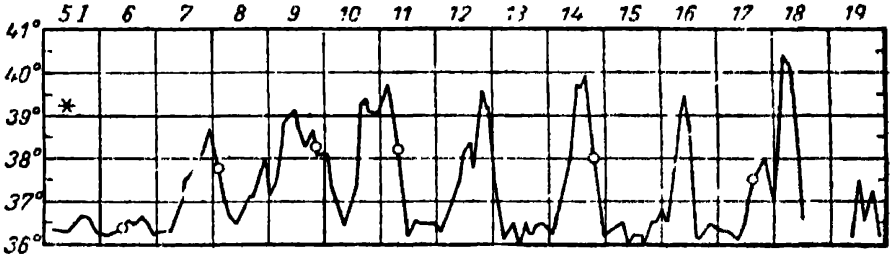

Fig. 9.—Malarial treatment in a patient with tabetic optic atrophy. (*Re-drawn from the 'Wiener medizinische Wochenschrift.'*)

B. Spiethoff,[4] of Jena, is also in favour of intravenous rather than subcutaneous inoculation. If the patient does not develop his fever by the evening of the fourth day a second intravenous inoculation is given, and, if necessary, even a third four days later. The chief complication which is liable to arise following inoculated malaria is that of heart failure. Spiethoff therefore gives a daily prophylactic dose of digitalis from the day of inoculation onwards and throughout the treatment. This may require to be supplemented by injections of camphor, especially if there is hyperpyrexia. When the required number of paroxysms has been reached, he prefers to abort the fever by means of salvarsan, whether neosalvarsan intravenously or myosalvarsan by intramuscular injection. He claims that salvarsan is equally efficacious as, and better tolerated than, quinine, with the additional advantage of attacking the syphilitic infection.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* 1928, March 10, 760; [2]*Wien. klin. Woch.* 1927, Nov. 17, 1445; [3]*Ibid.* 1928, April 26, 586; [4]*Münch. med. Woch.* 1928, March 23, 509.

DENGUE. *Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.*

Parasites have repeatedly been described in dengue without confirmation being forthcoming, and renewed hope is aroused by a short paper by such experienced workers as A. W. Sellards and J. Siler,[1] in which they describe and figure Rickettsia masses found in the hind-gut, but not in the salivary glands, of *Ædes ægypti* mosquitoes previously infected from dengue patients, and proved capable of transmitting the disease, while none were met with in control mosquitoes. In some of them a contaminating protozoal parasite of doubtful nature was also met with, and further work is in hand on the subject. P. A. Schule[2] has confirmed earlier work on the *Ædes ægypti* mosquito being an efficient carrier of dengue infection, and found that the insects were not infective in from two to six days after being fed on an infected person, but they were infective after eight, ten, or more days. H. Kamal[3] has described an epidemic of dengue in Egypt in 1927, the first since 1906–7, which presented the usual features. A. D. Edington[4] reports a similar outbreak in Durban, South Africa, with at least 40,000 cases, although he states that the disease is not endemic there. In the same outbreak F. W. Cawston[5] drew attention to the danger of iron gutterings to roofs breeding the mosquito carriers of the disease, owing to their becoming warped and holding up the water.

REFERENCES.—[1]*Amer. Jour. Trop. Dis.* 1928, July, 299; [2]*Ibid.* 1928, May, 203; [3]*Brit. Med. Jour.* 1928, i, 1104; [4]*Jour. Med. Assoc. S. Africa*, 1927, Sept. 10, 446; [5]*Jour. Roy. Soc. Trop. Med. and Hyg.* 1927, July 1, 171.

DENTAL SEPSIS. *Robert Hutchison, M.D., F.R.C.P.*

According to J. F. Brailsford,[1] "patients suffering from dental sepsis may be roughly divided into two groups: (*a*) Those in whom the sepsis is associated with local pain; (*b*) Those in whom the sepsis is unassociated with local pain. The patient belonging to group (*a*) usually makes the earliest appointment with the dentist, who in the majority of cases is able to detect the seat of the pain. In a few cases, even after a thorough examination, the cause of pain may not be detected, particularly as the patient's localization is so poor, and frequently the pain mysteriously ceases before or while the clinical tests are being applied and cannot be elicited by further testing. This may happen on several occasions. A careful radiographic examination of these cases may reveal the cause in the form of hidden or deep-seated caries, and save the dental surgeon much time and annoyance and the patient much pain. The changes revealed by the radiograph may be obvious or very slight, but even so it may afford the only clue to the site of the pain. It is, however, chiefly with patients in group (*b*) that the radiograph is of the greatest value, because the lesion is often unsuspected by the patient, and frequently is not, and apparently cannot be, detected by the most carefully applied clinical tests; and it is not until the physician or surgeon finds signs or symptoms of a diseased condition which he knows to be generally due to absorption of toxic products from septic teeth that the teeth are radiographed and the lesion demonstrated.

"There would appear to be a very great difference of opinion amongst dental surgeons as to the significance of the radiographic findings. It is therefore advisable that the radiographs be interpreted by an unbiased observer. Some still attach no importance to any radiographic appearance, however gross, if the teeth are comfortable and apparently sound; others are prepared to treat lesions which show on the radiographs as dark areas (light areas on the prints made from radiographs, as in the accompanying illustrations) of absorption of the periapical tissues, but do not feel justified in 'sacrificing' useful and comfortable teeth solely on 'slight' radiographic evidence. Experience has now proved that the extraction of such teeth often relieves the symptoms of the patient, and Price states that when such teeth, or cultures therefrom, are inserted into experimental animals the latter die of toxic absorption or infection. On the other hand, some dental surgeons go to the other extreme and extract teeth the best radiographs of which show not the slightest change. Yet Price says:—

> "I wish to stress that we have come to the time when involved teeth can be so definitely differentiated from those that are not involved or with a sufficient limit of error that we are not justified in condemning all the teeth for fear they may be involved. I am seeing continually patients who are suffering more from the inconvenience and difficulties of mastication and nourishment than they did from the lesion from which their physician or dentist had sought to give them relief.

THE RADIOGRAPHIC APPEARANCE OF SEPTIC TEETH.

"It must be clearly understood that the evidence which the radiograph gives is only a 'skeleton' picture of the pathological lesion. The actual lesion, certainly in bone pathology, is always of much greater extent than the radiograph suggests to an untrained observer. Therefore in dental conditions, where the important changes are relatively small in size, it is important to have radiographs which will show these details. Fortunately the close proximity of the radiographic film to the tooth enables a sharp and detailed picture to be obtained which will permit of magnification, and as the danger of the lesion is not to be judged by its size, such magnification will not mislead by showing the slight changes to be definite irregularities. The outline on the radiograph of a normal tooth enlarged to the size of the radiograph of the femur head is seen to be quite as regular as the latter, whereas the outlines of teeth which show 'slight' changes are markedly irregular—a femur head so irregular would be judged to be gravely involved.

"Weston A. Price, who with a team of dental surgeons, bacteriologists, and laboratory workers has carried out a very extensive investigation on dental sepsis, considers that 10 per cent of the teeth with septic roots give no indication of this on the radiograph; but even so, most of the process illustrations which he used in describing the 'failure' of the radiographs show definite though 'slight' changes, yet process illustrations cannot give the detail of the original radiographs.

"There is no doubt that the figure of 10 per cent can be considerably reduced by the skill in the radiographic technique and the care exercised in examining and interpreting the radiograph. Further, *every tooth which is producing* *systemic disturbance shows definite changes on the radiograph.* The importance of this is apparent when we remember that the clinical tests, even when skilfully employed, may fail to reveal quite extensive lesions.

"Price, who has made an exhaustive study of the individual and family clinical histories, clinical, radiographic, and bacteriological examination of the teeth of 681 selected cases in a series of 1400, has classified patients into three groups. He says that dental infections tend to produce the same type of tissue reaction around the teeth of different members of the same family.

"*Group A.*—The radiographs of this group show very extensive rarefaction around all the involved teeth, and often extensive pyorrhœa (as in *Plate XXII, A*). He regards this local bone absorption as a sign of a good reaction and resistance to the infection on the part of the patients. Such patients, he says, rarely show symptoms of the rheumatic or degenerative disorders, and he accordingly classes them as having 'absent susceptibility'. Nevertheless, such patients come to hospital complaining of gastro-intestinal or other disorders probably brought about by the septic teeth. Clinically the gums show discharging sinuses, and the teeth are often loose, readily anæsthetized, and easily extracted; the sockets heal with great rapidity and without discomfort or secondary infection.

"*Group B.*—In this group the radiographs show similar changes to those in *Group A*, but the peri-apical areas of rarefaction are bounded by a zone of sclerosed and therefore denser bone (*Plate XXII, B*). He regards this sclerosed bone as a sign of breaking down of the local resistance to the dental sepsis with the entrance of the septic material into the blood-stream. Clinically there are signs of old fistulæ and a history of former tenderness. Anæsthesia is less easily produced in patients in this group than in those in *Group A*. The teeth frequently are difficult to extract, and the sockets do not heal so readily. He says that these patients had acquired a susceptibility to the dental infection, and that, while no rheumatic symptoms were seen when the condition was acute, such symptoms had begun to appear, and they cleared with the removal of the septic teeth.

"*Group C.*—The radiographs of this group show condensing osteitis around the infected root with little rarefaction (*Plate XXII, C*). This appearance he regards as a sign of lack of local resistance to the dental sepsis. Clinically there is no evidence of fistulæ; the teeth are seldom tender. They appear to be more liable to caries, but are usually free from pyorrhœa. Anæsthesia of such teeth is far from easy, and they are often very difficult to extract. There is great tardiness in healing, and the sockets tend to become infected and painful. Price says that these patients have an inherited susceptibility to the rheumatic group of diseases.

"This classification tends to explain why some patients with extreme and obvious dental sepsis have often few of the symptoms usually associated with septic absorption, while others with marked rheumatic symptoms have often no obvious dental sepsis, and the radiographs of their teeth show relatively slight changes—so slight that when indicated by the physician or radiologist the dental surgeon is loath to extract the teeth; yet it is often in patients with these 'slight' dental lesions that extraction produces marked beneficial effects. As these important indications are relatively slight it is all the more essential that the radiographic technique should be good. Most physicians will agree that these dental groupings are correct with regard to the susceptibility to rheumatic infections, but few will agree with the ideas on local resistance.

"An examination of the radiographs showing bone sepsis of different types permits of the classification into three groups which resemble those indicated by Price:—

"*Group a.*—Patients with bone sepsis due to pyogenic bacteria. The radiographs in these cases show rapid absorption or erosion of the infected bone, and

PLATE XXII

DENTAL SEPSIS

(J. F. Brailsford)

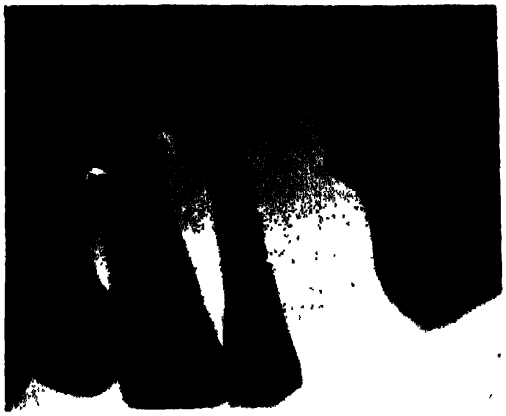

Fig. A.—Showing extensive alveolar and peri-apical absorption.

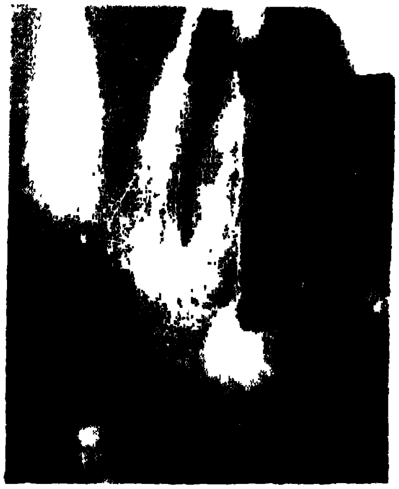

Fig. B.—A large apical abscess with sclerosis of its bony wall and erosion of the tooth apex. The lateral incisor is root-filled and there is a little erosion of its apex.

Fig. E.—Large cyst with erosion of the apices of the central and lateral incisors which have had the pulps extracted and the root canals partly filled.

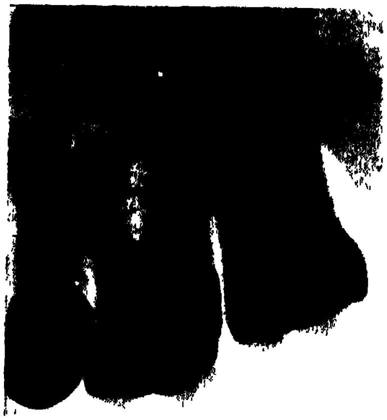

Fig. C.—Small areas of rarefaction at the apices of the bicuspid and molars with sclerosis of the surrounding bone.

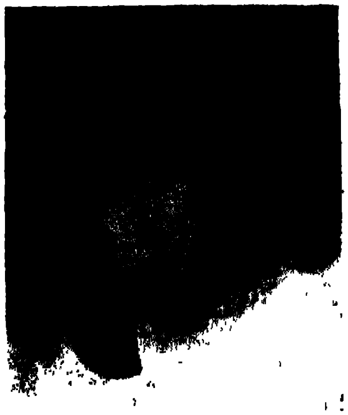

Fig. D.—Retained stump with large abscess.

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frequently a large amount of pus is found. As the condition of the patient improves and his resistance is increased, the rarefied bone increases in density and the patient shows little or no sign of rheumatic disorders, even though the degree of septic absorption, as judged from the patient's condition, was very severe.

"*Group b.*—Patients who formerly showed radiographic changes similar to those in *Group a*, but, owing to the separation of sequestra or the inclusion of some septic foreign body, healing is very slow, and the radiograph shows that the surrounding bone is sclerosed and very dense. This sclerosis most of us look upon as of the nature of a protective reaction against a chronic infection, and not as a breakdown in the resistance of the patient, though such patients often do gradually develop rheumatic symptoms, due probably to the long period of slow septic absorption.

"*Group c.*—Patients suffering from non-specific infective arthritis. Radiographs of the infected joints do not suggest ordinary bone sepsis; rarefaction, erosion, and sclerosis may be seen, but the changes are slow to form. They resemble the changes in the teeth of *Group C*. Numerous bacteriological researches have been made to attempt to discover the causal organism; various organisms have been suggested, but the lack of uniformity in the findings suggests that the condition is produced either by different organisms or by some bacteria or toxin which has not been discovered.

"Price has shown that septic teeth from patients in this group, even when boiled, retain some toxin which is fatal to experimental animals. He found, too, that extracts from such teeth passed through a Berkefeld filter are also toxic to animals.

"One of the most important points that Price has brought out is that the septic teeth from which absorption is taking place in patients with an inherited susceptibility to the rheumatic and degenerative disorders produce very little in the way of local clinical signs, which are small in magnitude. The fact that the patient has edentulous gums does not exclude the possibility of hidden dental sepsis. It is a fairly common thing to find that such patients have a retained stump which shows marked peri-apical erosion indicative of sepsis (*Plate XXII, D*). An X-ray examination may show definite evidence of apical sepsis of teeth which have not been filled and which show no evidence of caries. In some cases infection of the peri-apical area leads to the development of large cysts, which in the upper jaw may be mistaken for extension of the antrum (*Plate XXII, E*), but they can be readily distinguished from the latter by the fact that in the dental cyst the apices are denuded of the pericementum, whereas with the antrum extension the wall of the latter appears to be folded around the apices. Concomitant with the peri-apical erosion, hypercementosis may occur, and the roots may assume a bulbous appearance on the radiograph. Such teeth may be very difficult to extract.

"*Misinterpretation of the Radiograph.*—This is due chiefly to: (1) Lack of experience in interpreting radiographic shadows; (2) Lack of knowledge of general and dental pathology.

"With regard to (1), every radiologist who has correlated the radiographic and clinical, operative, or post-mortem findings knows that the radiograph may show only slight changes even when a massive lesion is present. Thus with acute inflammatory lesions of the skeletal tissues the radiograph may give no sign; even with the enormous development which one sees in some cases of periosteal sarcoma the radiograph may show nothing abnormal or perhaps a little localized thickening of the periosteum. It can almost be said, particularly in acute conditions, that the more attractive the physical signs, the less the radiographic signs. In the case of dental radiography, as the lesions are often small, it is all the more important to pay attention to the finer details.

"As regards (2), there is no question that for the best interpretation of radiographs the observer must have a good knowledge of the normal and pathological anatomy of the part. Most books dealing with the radiography of the teeth instance the interpretation of the mental and palatine foramina and loculi of the maxillary antrum as areas of peri-apical absorption, so that these mistakes are hardly likely to be repeated except by the beginner; even if they are, the worst that can happen is the sacrifice of one or perhaps two sound teeth.

"The result of the wide knowledge of the faulty interpretation of these foramina has no doubt been responsible for the much more grave error which is brought to one's notice from time to time—that is, the interpretation of a definite peri-apical absorption as a normal foramen or sinus. It would almost seem that the larger the cyst the greater the possibility of it being interpreted as a shadow of the antrum. This is of great importance, because the systemic disease from which the patient is suffering continues or increases in severity as the suspected cause has been overlooked and allowed to remain—there being no local signs apparent to the patient or the clinical observer."

Leonard G. J. Mackey[2] describes 3 cases of prolonged pyrexia without physical signs which proved to be due to infected teeth. In each case the temperature had gone on for some weeks and occasionally reached as high as 103° F. without the patient feeling really ill. The diagnosis of the cause was only arrived at by radiography. and the temperature ceased immediately with the extraction of the affected teeth.

MULTIPLE EXTRACTIONS.

Harvey Hilliard[3] enters a plea for the taking of *multiple extractions*, and other major dental operations, more seriously. He makes the following suggestions: (1) That multiple extractions should be treated as one major operation; (2) That the patient should be medically examined before the operation is undertaken, having at the same time an examination of the blood; (3) That the patient should be properly prepared for the operation; (4) That the operation should be performed at the patient's own home or in a nursing home or hospital, so that immediately thereafter the patient can be put to bed and proper care and after-treatment be ensured; (5) That a proper period of convalescence should be arranged for, and that the patient should be immediately fitted with a temporary denture, so that he can partake of the diet he has found by experience best suited to him, and thus be saved from the risk of being half starved, with its inherent danger of consecutive disease.

REFERENCES.—[1]*Brit. Med. Jour.* 1928, i. 1013; [2]*Ibid.* 1021; [3]*Lancet*, 1928, i. 793.

DERMATITIS MEDICAMENTOSA.

A. M. H. Gray, M.D., F.R.C.P., F.R.C.S.

Ioderma from Iodized Oil.—G. H. Belote[1] reports the development of an acneiform eruption which was considered by several dermatologists to be typical of an iodide or bromide eruption. Iodine was found to be present in large quantities in the urine. On investigation it was found that iodine in some form had been administered on the following dates: Dec. 22, 1926, the patient received gall-bladder dye (tetraiodophenolphthalein) by mouth; from Jan. 11 to Jan. 16, 1927, he received potassium iodide 15 gr. three times a day; and on March 29, 1927, his lungs were injected with lipiodol. The eruption appeared on April 6 or 7, 1927. In view of the fact that no iodine other than lipiodol had been given for three months, that large quantities were present in the urine and saliva on April 13 to April 15, and that examination of the chest by X rays on April 14 showed the presence of lipiodol in the lung bases, the author concludes that the eruption was produced by this substance.

REFERENCE.—[1] *Jour. Amer. Med. Assoc.* 1927, ii, 882.

DERMATITIS SEBORRHŒICA. *A. M. H. Gray, M.D., F.R.C.P., F.R.C.S.*

Although it has long been believed, thanks mainly to the work of Sabouraud, that a yeast-like organism, known as the 'bottle bacillus' or 'spore of Malassez', was responsible, either alone or in symbiosis with other organisms, for producing pityriasis of the scalp and certain forms of seborrhœic dermatitis, yet the organism has in the past defied culture. J. M. H. MacLeod and G. B. Dowling[1] are able to show that as long ago as 1908 W. G. Garner, Pathological Assistant at St. John's Hospital, Leicester Square, had grown the organism on Sabouraud's maltose agar and on acid glycerin-agar mixture. The authors have now been able to study the cultures in detail. "It is pleomorphic and varies considerably in size. Its usual form is that of a gourd or flask, with a large spherical portion surmounted by a small roundish process, suggesting a budding yeast. It may also assume an hour-glass shape, with a constriction in the middle, or more rarely may be ovoid, round, or sausage-shaped. Its average size is from 3 to 7 μ in length and 2 to 6 μ in breadth. It may be arranged singly, but, as a rule, occurs in groups or chains of spores, varying in number up to 20 or more." "In preparations from fluid media, mycelial, non-septate threads are found in abundance. These are in the form of delicate hyphæ, with clubbed extremities and lateral buds. These buds form spores, which are about half the size of the spores seen in preparations of scales or from solid media." The organism gave an acid reaction to galactose, maltose, and glucose, but none to saccharose, inulin, dulcite, lactose, and mannite. Slight gas formation occurred with maltose and glucose, but none with the other sugars. The organism belongs to the group of yeast-like fungi. It is one of the Fungi imperfecti and of the class of the Oosporaceæ. It is nearly related to Monilia. The authors name it the 'Pityrosporon of Malassez'. Experiments were made with suspensions of the organism (1) by rubbing into the skin, (2) by intradermal injection, and (3) by implantation into scarifications. No results followed from simple rubbing into the skin, but by the other methods positive results were always obtained. In patients suffering from seborrhœic dermatitis, lesions were produced usually resembling those already present. In non-seborrhœic individuals a constant reaction was observed, which consisted in the development within twenty-four hours of a group of follicular papules, which lasted about ten days. In patients already suffering from seborrhœic dermatitis a reaction was sometimes observed in the lesions already present. A case of intertriginous dermatitis of the toes, associated with dermatitis of the legs, in which the 'Pityrosporon of Malassez' was cultivated, is also described.

REFERENCE.—[1] *Brit. Jour. Dermatol. and Syph.* 1928, April, 139.

DERMATITIS VENENATA. *A. M. H. Gray, M.D., F.R.C.P., F.R.C.S.*

Linseed Oil Dermatitis.—F. J. Vokoun[1] has investigated cases of dermatitis arising among workers in the production of linseed oil. He finds that cases were numerous in a firm to which he was attached as medical officer. The attacks were usually mild, but occasionally severe. Inquiries from other firms brought out similar experiences. The lesions were usually on the anterior aspects of the arms, the dorsa of the hands, and the anterior aspects of the thighs (in those men whose thighs touch the oil in their work). They were symmetrical, discrete, deep, and thickly scattered, and consisted of primary macules and papules with secondary scratch marks and crust formation. The symptoms were intolerable itching and burning, especially after bathing or retiring for the night. The author also finds the cases were more frequent when Indian or South American seed was being pressed than when Canadian or North American seed was used. The exact nature of the irritating substance is at present undetermined, but Dr. Kooperman, whom he quotes, considers it due not to the linseed oil but to the dust of the flax seed.

Chrome Ulcers.—J. Blair[2] has observed a number of cases of chrome ulceration among workers in automobile and allied industries. Chromium plating is now largely used for producing a rust-proof, non-tarnishing finish for headlights, radiator shells, door handles, and fixtures. The electrolytic solution contains a solution of chromic acid, and in the process there is a fine spray of chromic acid given off over the tank by the evolution of hydrogen at the cathode. The workmen engaged may inhale the fine particles, and may develop acute symptoms of a cold, with coryza, sneezing, watery discharge from the eyes and nose, and itching and burning of the nose. Some of the author's patients showed hyperæmia of the nasal mucosa with ulcers, while one developed a perforation of the septum. Eight patients who were engaged in removing the plated parts from the tanks had ulcerative lesions of the hands and fingers, the so-called 'chrome holes' or 'chrome ulcers'. The ulcers developed only where there had been a preceding break in the skin. Prophylactic measures, including the establishment of an efficient ventilating system, hoods over the tanks, the wearing of long-sleeved rubber gloves, and the use of **Vaseline** applied inside the nose, proved efficacious. A 5 per cent solution of **Sodium Hyposulphide** was found useful in neutralizing the chromic acid on the hands of workers not using gloves.

Dermatitis in Rubber Works.—C. Badham and K. R. Moore[3] report their investigations into cases of dermatitis occurring in two rubber works in Sydney. In one factory one case only occurred during the twelve months under investigation out of an average of 250 employees. In the other, 136 cases occurred during a similar period amongst an average of 1500 workers. In the latter works the majority of cases occurred in the shoemaking and tyre-building departments and the mills which supply stock for the whole factory. A comparison between the working processes and compounds used in the two factories revealed three factors which probably accounted for the high incidence of dermatitis in the one: (1) The use of a butyraldehyde condensation product, dimethyl-paraphenylene-diamine, as an accelerator; (2) The use for an isolated period of hexamethylene-tetramine as an accelerator for certain classes of goods, which resulted in an outbreak of fissured palms and fingers in tyre builders, due apparently to an unusual liberation of formaldehyde as a decomposition product; (3) The use of benzine for cleaning hands and arms.

Dermatitis from 'Horn-rim' Spectacles.—J. C. Sutton[4] records the case of a female, age 57, who developed an acute swelling of both eyelids and surrounding structures after wearing, for half an hour, a new pair of spectacles with xylonite rims. On the upper part of each cheek, where the frames had rested, were two corresponding whitish areas, which looked as though they had been cauterized with phenol. After washing with soap and water, the frames were fixed on to the anterior surface of the left forearm for twenty minutes. Three hours later an eruption appeared identical with the outline of the front of the glasses. A similar experiment was tried after the frames had been dipped in acetone to make sure that no polish or external enamel was producing the trouble, but the reaction was again produced. The author considers that the dermatitis was due either to a dye or to an improper cure of the xylonite.

Dermatitis from Quinine Suppositories.—Hansen[5] records three cases of dermatitis from the use of quinine pessaries. One case, a female, developed an acute weeping eczema of the genitals and surrounding structures after using suppositories which, unknown to her, contained quinine. She had previously developed rashes on taking quinine internally. The other two cases were in males, who developed eczematous eruptions in the genital regions and thighs, and in these cases it was found that the wives were using quinine pessaries. In one case the patient also developed a severe erythema on taking quinine internally, and in the other a severe dermatitis of the scalp had developed after using a hair lotion containing the same drug.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* 1927, ii, 20; [2]*Ibid.* 1928, i, 1927; [3]*Report of Director-General of Public Health, New South Wales,* 1926, Sect. 1, c.; [4]*Jour. Amer. Med. Assoc.* 1927, ii, 1059; [5]*Tidsskr. f. d. Norske Lægeforening.* (abstr. *Clin. Jour.* 1928, May 2, 214).

DERMATOSIS, SCHAMBERG'S PROGRESSIVE PIGMENTARY.

A. M. H. Gray, M.D., F.R.C.P., F.R.C.S.

J. F. Schamberg[1] has examined the blood in five cases of this curious pigmentary disease, which he first described in 1901, and finds that the cholesterol content of the blood is markedly raised in four out of the five cases, varying from 233 mgrm. to 300 mgrm. per 100 c.c. In the fifth case the quantity was 174 mgrm. per 100 c.c. In thirty-nine control cases suffering from various other dermatoses the cholesterol content of the blood only exceeded 200 mgrm. in three cases, one of whom suffered from gall-stones. The author is not prepared to theorize on the subject until further investigations have confirmed these observations.

REFERENCE. [1]*Brit. Jour. Dermatol.* 1927, Oct., 389.

DIABETES AND GLYCOSURIA.

Hugh MacLean, M.D., D.Sc., F.R.C.P.
J. Forest Smith, M.R.C.P.

The Underlying Process in Diabetes.—The progress of research into the etiology and treatment of diabetes has proceeded along relatively few lines. Insulin, whilst placing in our hands a remedy for the control of diabetes, has not been instrumental in clearing up many of the fundamental problems connected with this disease. Diabetes, before regarded as a disturbance in the proper assimilation and utilization of carbohydrate, must now be regarded as a complex in which the whole metabolic picture is thrown out of equilibrium. The three main food groups, protein, fat, and carbohydrate, all take part in the metabolic disturbance. The widely accepted view of the processes taking place in diabetes may be summarized shortly as follows: The diabetic organism has primarily lost the power, in greater or less degree, of both storing and oxidizing sugar— storing in the liver as glycogen, and oxidizing in the tissues. Deficient storage of glycogen in the liver may be regarded from two standpoints: Either (1) the diabetic organism has actually become unable to form glycogen from sugar, or (2) glycogen is formed, but is so rapidly broken down that it is at once discharged into the blood-stream as glucose. The view most generally taken is the former, but the latter has recently received support from W. Cramer.[1] Whichever standpoint is taken, the net result is that ingested carbohydrate finds its way into the blood in quantities far in excess of the normal, the blood-sugar mounts to levels above the so-called renal threshold, and glycosuria results. This excessive sugar content of the blood cannot be effectively dealt with by the tissues by oxidation, since the function of normal muscles is greatly impaired in the diabetic.

But—and this is of great importance in diagnosing any given case—the degree to which the storage mechanism is defective may not be at all of the same order as that to which the oxidation mechanism is effected. The following case illustrates this point very clearly: The patient, a man of 47 years, was found to have a glycosuria; a sugar-tolerance test was made, with determinations of respiratory metabolism. The following results were obtained after the administration of 50 grm. glucose at 0 hour fasting :—

TIME	B S.	R.Q.	O	CALS. PER HOUR
hours			c.c. per min	
0	0·141	0·88	189	55·6
½	0·222	0·94	245	73·2
1	0·243	1·04	227	68·8
1½	0·236	-		-
2	0·171		-	-

These findings show conclusively that a very definite deficiency in storage power, with marked glycosuria, may be accompanied by a very effective sugar-oxidizing mechanism. Such a picture is frequently shown by obese patients, and will be referred to later.

In general, however, in a well-established diabetes there is definite deficiency in oxidation as well as storage power. As a result of this loss of power to assimilate and utilize carbohydrate, the diabetic organism seems, vitalistically speaking, to lose all sense of balance. Every possible available source of carbohydrate is called upon to form sugar. Body protein is broken down, and a greatly increased loss of nitrogen occurs, as a result of which, it is generally held, acid ketone substances are produced. These so-called ketone substances, all derivatives of β-hydroxybutyric acid, are regarded in part as by-products in the breakdown of protein. At the same time the metabolism of fat is for some reason disturbed, with further production of ketones, since, as can easily be shown even in the normal subject, the necessary condition for the complete utilization of fat is an adequate utilization of carbohydrate. As a result of this complicated series of events the symptom complex of diabetes is produced, and the whole process may be brought back to normality by means of insulin.

The Action of Insulin.—The exact mode of action of insulin is unknown; we can only speak of end-effects. The work of H. H. Dale and his collaborators[2] has done much to clear up this problem. These workers have shown that insulin, even in the perfused, decapitated, and eviscerated animal, brings about a rapid formation of glycogen and increased oxidation. By quantitative estimations they were able to demonstrate that the amount of sugar disappearing from the perfusion system under the action of insulin was almost exactly accounted for by the increase in glycogen and the increase in oxygen absorption. J. J. MacLeod *et al.*,[3] and C. F. and C. T. Cori,[4] working with starved albino rats, were also able to demonstrate an almost exact equivalence between disappearing sugar under the influence of insulin and formation and oxidation of glycogen. It would thus appear that the main effect of insulin is to stimulate the formation of glycogen and the oxidation of glucose. This effect can be demonstrated both in the normal organism and the diabetic; but the exact way in which the insulin does this is unknown. It has variously been stated that insulin is a catalyst, that it brings about a change in the molecular arrangement of the carbohydrate molecule, and that it acts via the nervous system, but no view has been substantiated in its entirety. As has already been said, we can only speak of end-effects in regard to this pancreatic extract.

Substitutes for Insulin for Oral Administration.—The inconvenience of frequent subcutaneous injections of insulin has given rise to many efforts to obtain substances which can lower blood-sugar and prevent glycosuria when given by mouth. Prolonged use of insulin does not, however, as shown by R. D. Lawrence,[5] bring about any more serious local trouble than a temporary œdematous exudate and slight fibrosis, provided that the injections are not repeated too frequently in one situation. E. P. Joslin's[4] plan of puncture maps showing the points at which successive injections must be made is particularly useful with children, for if a limited area only is used for some length of time marked fibrosis and fat atrophy may occur. The principal substances which have been brought forward for oral administration in the treatment of diabetes are synthalin and glukhorment.

Synthalin is decamethylenediguanidine dihydrochloride, and was brought forward by E. Frank[7] and his co-workers at Breslau, who showed that this substance can lower blood-sugar and remove ketosis, but that it had no effective success in cases of coma. It is generally agreed that the blood-sugar-lowering power of this compound is marked, but that its effect is prolonged but delayed, and that on the other hand it can in many cases bring about severe toxic and intestinal symptoms –headache, anorexia, nausea, and frequently vomiting. Working with animals, it has been shown that doses of synthalin sufficient to produce big drops in blood-sugar also produce definite degenerative changes in the liver. Clinical investigations of the effect of synthalin have yielded variable results. W. H. Jansen and H. Baur[8] obtained unsatisfactory results; E. P. Joslin,[9] I. M. Rabinowitch,[10] O. Leyton,[11] and H. MacLean[11] had some success; but R. D. Lawrence[11] had no success at all. G. Graham,[12] and A. I. Ringer, S. Billoon, M. M. Harris, and A. Landy,[13] however, had some encouraging results, and considered synthalin a definite step in advance towards an oral therapy. The position seems to be that whilst synthalin can to some extent replace part of the insulin necessary in a given case, its toxic effects do not augur any extensive therapeutic application.

Glukhorment is a substance obtained from residues after fermentation of pancreatic tissue, and was introduced to the medical world by Professor C. van Noorden in May, 1927, with the assurance that, although it contained no insulin, it reduced hyperglycæmia and glycosuria. It is claimed by its discoverer, Meissner, that glukhorment can replace insulin or reduce its dose, and further that its effects are not transitory. B. Dubovsky[14] had considerable success with this product, and he reports very favourably upon it. R. D. Lawrence,[11] however, states that glukhorment is probably nothing but synthalin or a synthalin-like substance, that it can to some extent replace insulin, but that its toxic action precludes it from having any significant therapeutic application.

In regard to the various **Pancreatic Extracts** which have been put forward by manufacturing firms for oral administration, C. B. S. Fuller[15] concludes that they are quite valueless, and may do harm by delaying proper treatment. Insulin, therefore, still remains the only effective agent in controlling diabetic cases adequately.

It will be convenient at this point to refer to a product from which some help was expected, namely, **Intarvin.** This substance, glyceryl trimargarate, was put forward in 1923 by Kahn as a fat containing an odd-carbon chain of fatty acid, which, theoretically, could give no ketosis when broken down by the organism. It was hoped that by replacing the fat in a diet, at least in part, by intarvin, the production of acetone, etc., would be largely reduced and the danger of coma lessened. Opinion has been divided on the value of this substance, but some recent work by Max Einhorn and W. P. Braunstein[16] suggests that there may be a limited field of use for this laboratory product. They give two types of cases in which it may be useful: (1) Those diabetics who continue to show ketosis even on a maintenance diet; (2) Those cases where insulin may not be necessary or desirable, but where gain in weight is essential. The best way in which to use it is to disguise it in coffee or broth, but even then it is not easy to take. If, however, it can be substantiated that intarvin brings about a gain in weight, its range of application will certainly increase, particularly as there is no attendant danger of coma.

Diet.—Considerable difference of opinion exists on the question of suitable diet to be administered in different grades of diabetes. Joslin takes the view that diet should be as near as possible to normal, and that the high-fat and low-carbohydrate diet recommended by some authorities is dangerous both in principle and practice and may lead to coma. Care must be taken to avoid over-nutrition, and the weight of the patient should be watched and as far as possible kept nearly normal. The rapid gain in weight so often seen in the course of treatment with insulin is no indication that the ultimate outcome will be good. One danger of high-fat diets lies in the possible stimulus to arteriosclerosis, and Joslin recommends avoidance of diets with high cholesterol content. An egg, for example, contains about 0·4 grm. cholesterol. The question is by no means settled or clear, for diabetics show every degree of cholesterol anæmia, old-standing cases very often having low values.

Petrén has adopted the principle of a very high fat diet with entire removal of protein, and COH only as 5 per cent vegetables, until the blood-pressure becomes normal, and then establishment of a maintenance diet. The underlying rationale of this form of treatment is that limitation of protein prevents development of acidosis and ketosis, so much so that recently H. Dennig[17] kept diabetics on Petrén's diet for six weeks with a daily excretion of only 2 to 3 grm. nitrogen per day and no development of ketosis, but he does not continue this for longer. Then the diet is very gradually increased by addition of, say, 10 grm. bread or one egg or meat every fourth day, always watching that the blood-sugar remains normal. If the diet is increased suddenly the patient goes back, but if it is done very gradually the tolerance increases more and more. Petrén himself does not allow the blood-sugar to rise above 0·12 per cent, but Dennig allowed it to rise even as high as 0·16 per cent, and when it was impossible to readjust the glycæmia by diet only insulin was given. Petrén's method is not adapted to the treatment of very severe cases.

Diabetes in Children.—The treatment of the diabetic child is always a matter of difficulty and anxiety, and the progress of its growth and development are entirely in the hands of the clinician. J. W. Sherrill[18] concludes, from the study of sixty-two living diabetic children, that the best results are obtained by keeping them sugar-free constantly and regulating the diet to keep the weight within normal limits. Obese children are most difficult. He gives as the optimum keto-antiketogenic ratio 1 : 1. Joslin recommends exercise and social life as important factors in the development of the diabetic child, and sees no reason for pessimism in the matter of their future.

Diabetes and Pregnancy.—The problem of diabetes and pregnancy, for so long a matter of extreme difficulty, has been solved to the same degree as the problem of diabetes itself. E. White[19] reports that she has seen no intercurrent infection in diabetic pregnancies since 1922. A. Walker[20] states that there is no ground for terminating pregnancy, nor is there any reason against the delivery of a live child, and further, that pregnancy does not aggravate the diabetes. Indeed, during pregnancy there often occurs an increase in tolerance, which, it has been suggested, may be due to the generation of the fœtal pancreas.

Diabetic Manifestations in Hyperthyroidism.—It is well known that in hyperthyroid states, whether arising as in Graves' disease or by artificial administration of thyroid substance, there is a diminished tolerance to carbohydrate which may simulate diabetes. Hyperglycæmia, high and delaye blood-sugar curves, and glycosuria may all occur, but ketosis is not a marke feature, and the oxidation metabolism is not interfered with. The questio therefore arises as to whether cases of hyperthyroidism are to be regarde as potential diabetics and treated as such, or whether the state is transien and merely dependent on the thyroid condition. H. J. John,[21] in some recen interesting work, concludes that such diminished tolerance should be regarde as a functional diabetes, and should be treated until it is certain that it ha cleared up. The degree of hyperglycæmia in these cases is not proportionat to the severity of the hyperthyroidism, and so, as John says, it would seen that the cause lies actually in the insulinogenic apparatus. Thyroidectom brings about a definite improvement in carbohydrate tolerance. F. A. Coll and C. B. Huggins[22] state that this latter effect does not occur in non-toxi thyroid states, and further, that coma may result after thyroidectomy if a coexistent diabetes is missed. Injections of insulin and adequate diet in thes cases will obviate any likelihood of an accident.

'Chronic Glycopenia.'—In contrast to the high glycæmias found in thyroi states, a condition of chronic and spontaneous hypoglycæmia has been describe recently. The cases described by E. Pribram[23] did not really show hypoglycæmia but what he calls 'chronic glycopenia'—namely, unusually lo blood-sugar, although not low enough to be called hypoglycæmia, i.e., abou 80 to 90 mgrm. per cent. This phenomenon was associated in Pribram's case with general weakness, chronic constipation, and vomiting, and hypo-endocrin conditions hypofunction of ovaries, parathyroid, and pituitary. The cas investigated by G. Laroche, Lelourdy, and J. A. Bussière[24] is of great interest, in that the patient, a woman of 35 years, had severe attacks of spontaneous hypoglycæmia merely by abstaining from food for some time. The cause of this condition is as yet unknown. The attacks are prevented by food (sugar), and the blood-sugar curve is high and delayed (!), which latter observation seems to rule out any question of hyperinsulinism. The patient was restored in forty to fifty minutes by 1 mgrm. adrenalin; extract of posterior pituitary relieved her, but more slowly; anterior lobe had no effect. Insulin is well borne by this patient in spite of a blood-sugar lower than those which without insulin were associated with severe symptoms, and the patient feels the better for the injection. This fact militates against believing that the condition is due to an Addisonian tendency of the suprarenal; for cases of Addison's disease show a great susceptibility to insulin. The explanation would seem to lie in the regulator mechanism of glycogenic function; but observations on more such cases are necessary.

Insulin and the Stimulation of Fat Formation.—The well-known increase in weight which occurs in cases treated with insulin, leading in many cases actually to obesity, leads us to ask how far the usual picture of an obese subject may be due to over-activity of the island tissue in the pancreas. W. Falta[25] years ago prognosticated purely on theoretical grounds that the internal secretion of the pancreas had the effect of stimulating formation of fat. Recently he[26] continues this idea by ascribing certain forms of obesity to insulinogenic causes. He finds that in cases where rapid increase of weight is taking place in an otherwise normal subject there occurs simultaneously an abnormally great secretory activity of the cells of Langerhans, but where there is a condition of stationary obesity this activity is normal. In cases of endogenous thinness—i.e., subjects in whom (1) very little food produces a feeling of fullness so that sufficient food cannot be taken, or (2) those in whom the processes of oxidation are so rapid that they become excessively thin—the administration of insulin produces startling results, especially in the former type. Appetite, assimilation, and storage are wonderfully increased, so that the patient takes more food, rapidly gains weight, and remains well even after the insulin treatment has been discontinued. It would be of interest to see how treatment by insulin and adequate diet would act in cases of nervous anorexias, for the feeling of hunger which is experienced when insulin is actively at work is one which it would be difficult to refuse to satisfy even in psychopathic states.

Renal Glycosuria.—The problem of renal glycosuria or 'glycosuria innocens' is still unsolved. Why certain patients should allow the passage of sugar into the urine at blood-sugar levels which in the normal patient are never associated with glycosuria is entirely unknown. The renal function of these cases is quite normal, and the majority of authorities consider that no dietary treatment is called for, the prognosis being regarded as entirely favourable. F. Umber and M. Rosenberg,[27] however, consider that this type of glycosuria is not so easily differentiated from true diabetes, because after some years they saw such cases change over into true diabetes. They consider that true renal glycosuria is not affected by insulin, and that this fact should be used to differentiate it from diabetes. This view has not, however, been substantiated as yet. An interesting case of a true diabetes of several years' standing which later became one of renal glycosuria is described by E. H. Mason,[28] but such events must be very rare. H. M. Bowcock and E. M. Greene[29] describe observations in a case of renal glycosuria during and after pregnancy. They found that during pregnancy there occurred a tendency to increased glycosuria, but the puerperium saw a marked fall in excreted sugar, which latter fact was attributed to the demand for sugar in the formation of lactose for the milk (*see also* I. I. Nitzescu[30]).

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DIET AND DIETING FROM THE PUBLIC HEALTH POINT OF VIEW.

Joseph Priestley, B.A., M.D., D.P.H.

The medical curriculum has not hitherto included the important subject of diet and dieting, and consequently we may assume that the newly-fledged medicos are ignorant of the subject—and yet they are expected to advise one and all amongst the laity on this particular point, which is so important in connection with health and well-being. A great advance, however, has recently been made in this respect in the appointment of Dr. Cowell by the University of London as Professor of Dietetics, the first appointment relating to that special but important subject that has yet been made in Britain.

As a fact, the matter of diet and dieting is a simple one, viewed on scientific lines and carried out on physiological principles. It is not sufficient for the medical practitioner to know that foods are classified into (*a*) proteins, (*b*) carbohydrates, (*c*) hydrocarbons, (*d*) minerals, and (*e*) food accessories (vitamins, water, etc.); he must know more—much more. Food values must be known—i.e., the compositions of the various articles of food in the terms of the above classification, and consequently the caloric value, or calories, that each foodstuff contains. Physiologically the subject is a fascinating one, and undoubtedly one that plays an important part in bodily health. Without fuel the human engine cannot work, and without properly graded fuel (graded as to both quantity and quality) the maximum work will not be obtainable from such engine—in other words, the human body will not be fit and healthy and its resistance to disease at its best. Health is wealth, and a sane body is necessary for a sane mind. Much depends upon proper diet, though few people realize the fact, and hence the necessity for medical practitioners being specially trained in the subject.

It is now admitted that living tissue, if properly and efficiently drained, and if suitably and regularly supplied with nutrient fluid, is practically everlasting. This living tissue is cellular and built up from microscopical cells, which are bunched together to form the various organs of the body as we know them, with their own various respective functions. As a corollary, it follows that diet must be varied as much as possible, quantity and quality both being considered, and regularity enforced both of intake and outlet. Do not stint the fat, nor forget the water. More disease and ill health arise from over-feeding than from over-drinking. Suitable nourishment is essential, but is not the sole essence of feeding. Packing material is necessary also—something that the stomach and intestinal walls can grip and carry forward throughout the long length of the 26 feet or so of the intestinal tract. 'Roughage' it is sometimes called, and consists chiefly of indigestible cellular tissue. Take, for instance, vegetables and fruits. In these there is much of this packing, indigestible matter, mixed, of course, with proteins, carbohydrates, mineral matters, and large quantities of water (and traces of vitamins).

Milk is the *ideal* food, with the various necessary ingredients mixed in their respective proper proportions—ideal for infants and children, but also equally ideal for adults who, on account of disease or illness, require to be restricted to a milk diet. A navvy on full work can carry out his duties, strenuous though they be, on a milk diet, but the quantity required is not less than 2 to 3 quarts per day as a minimum. The average composition of milk is simple—3 per cent fat, 8·5 per cent solids not fat, and 88·5 per cent water. Amongst the 'solids not fat' are the important vitamins (as food accessories) and casein (which, in addition, acts as packing or roughage). What can be simpler? Ordinary every-day diet, however, takes on another form—variety and complexity. Hence it is that the medical practitioner must know all about food values, and where the food principles are to be found and in what proportions. The drawing-up of diets therefore becomes an important scientific matter—both for the individual and for institutions and schools, etc. Special hospital dietary is a thing apart, of course. Bovril or Oxo is generally regarded by the public as concentrated nutrition. It is more scientific, however, to attribute the value of these and many similar preparations to the *stimulating* effects of the kreatin and kreatinin that are contained therein. The old-fashioned, but not easily beaten, Valentine's Meat-juice is well known to all medical practitioners as such a valuable stimulant. Take a piece of potato and a piece of steak and analyse them. What do we find? In each the percentage of water is 70 to 80. The remainder, in the potato, gives 19 per cent starch (or carbohydrates), 1·2 per cent protein, 0·6 per cent fat, and 0·9 per cent mineral matters; and, in the steak, it gives 21 per cent protein, 5 per cent fat, 1 per cent mineral matters, and no starch or carbohydrates). Again, take a piece of bread and an egg. The bread on analysis gives water 39 per cent, starch (carbohydrates) 51 per cent, protein 6·5 per cent, fat 1·0 per cent, and mineral matters 1·0 per cent: whilst the egg shows water 73 per cent, protein 14·8 per cent, fat 10·5 per cent, mineral matters 1·0 per cent, and no starch (or carbohydrates).

From the above simple analyses, it will be realized that what is meant by 'food-values' is important from the point of view of the public health. And yet what does the average medical practitioner know about the subject? All stokers of furnaces know the respective values of different fuels, and after all the human furnace (or body) would appear to be far more important than an ordinary furnace. The analyses show also that a mixed diet appears to be a necessity; so as to get the right amounts of carbohydrates, proteins, fats, and mineral matters, etc., easily at a meal. To trust to potatoes for the protein necessary, or to steak for the carbohydrates necessary, would be manifestly absurd, and would lead, sooner or later, to the clogging or clinkering of the human furnace. In the same way, man cannot live on bread alone, or on potatoes alone, or on meat alone, or on eggs alone, or even on vegetables alone, but he can on milk alone -but monotonously.

Proteins are found in meat, peas and beans, milk, eggs, cheese, fish, etc., as also (in small amounts) in potatoes, green vegetables, cereals, rice, etc. The proteins, as such, are split up during digestion into amino-acids. The more amino-acid a protein contains, the more valuable as a food such protein is. Carbohydrates are found in starches and sugars, and during digestion the starches are converted into grape-sugar. As starches the following may be mentioned: cereals, carrots, potatoes, artichokes, etc.; and as sugars, the following: cane, beet, grape (or fruit), lactose (or milk), maltose, etc. Fats speak for themselves and are well known in their various forms. Except in the coldest countries, fats cannot be taken in excess with impunity. In mixture with proteins, starches, sugars, mineral matters, etc., fats are invaluable, especially butter and margarine. The value of mineral matters or salts cannot be over-estimated: they prevent deficiency diseases. As examples may be set out the following: calcium, phosphorus, iron, iodine, chlorine, etc.; and their sources are: cheese, eggs, oatmeal, milk, meat, green vegetables, fish, common salt. When cooking vegetables, they should be steamed, and not boiled.

The value of vitamins is now acknowledged, and that they act as food accessories is admitted but not perfectly understood as yet. Fruits and fresh vegetables are sheet anchors where vitamins are concerned, as also are butter, milk, cod-liver oil, egg-yolk, and fats generally. In this respect the value of sun-kissed tomatoes and yeast (marmite), and especially oranges, must be remembered. There are four vitamins classified —A, B, C, and D—and in connection with vitamin D it is reported that this particular vitamin has been synthetically produced and can now be added to any dietary scheme in the form of pellets or tablets which can be carried in the waistcoat pocket. This substance consists of ergosterol, which, by irradiation with ultra-violet light, produces vitamin D, and is then known as radiostol. It is a British production, and supplied commercially by the British Drug Houses, Limited. The discovery of the substance was made by the National Institute of Medical Research, Hampstead. Cod-liver oil has in the past been the source—and the only source —of vitamin D, and the preparation now in use is known as radio-malt—a mixture of cod-liver oil and malt, easily digested and tasting like toffee. Added to margarine, vitamin D makes such margarine equal in food value to butter. Vitamin D is an antirachitic substance, and should be given to nursing mothers as well as to weaned infants and children. The question naturally arises as to what had been done in the past before this new discovery was made. The action of the sun's rays on the skin of the human body produces small quantities of vitamin D. The same applies to the skins of cattle the vitamin D being stored up in the milk of the cows and being obtainable therefrom, or from the butter made from such milk.

Brillat-Savarin said, "Tell me what you eat: I will tell you what you are." So much for the well-known French epicure. The medical man of to-day must reverse this maxim and must say, "Tell me what you are: I will tell you what to eat." The task is not an easy one. Personal idiosyncrasy must be taken into account: "What is one man's meat is another man's poison." Diet faddists often thrive in spite of their fads.

There is one thing now generally (faddists excepted) agreed, viz., that the use of white bread does not cause or predispose to cancer, appendicitis, etc. Vitamin B is, in fact, contained in white bread, but certainly not to the same extent as in wholemeal bread. This deficiency is partly overcome by the addition of yeast when the flour, which is practically without vitamin B, is made into bread. In other words, white bread of good quality is quite a wholesome and nutritious food—a statement that will give heart to many diet faddists and others; and wholemeal bread will not, of itself, necessarily convert a C3 into an A1 nation. Wholemeal bread does not suit everyone: it acts in many as an irritant to the digestive tract—a fact that, in the case of sensitive digestive tracts, makes wholemeal bread 'contra-indicated'. This fact must not be forgotten, even allowing that wholemeal bread is a good article of diet for many people if they can 'tolerate' it. As a matter of fact, white bread contains more food calories than wholemeal bread. This is, however, now rebutted by the statement that food calories do not count in dietaries—at least, as essentials.

DIPHTHERIA.

J. D. Rolleston, M.D.

Epidemiology.—The fifth annual summary by the *Journal of the American Medical Association*[1] of diphtheria mortality in the cities of the United States with a population of more than 100,000—now numbering 81—shows that the total diphtheria death-rate for all the large cities was notably higher in 1927 (10·43 per 100,000) than in either of the two preceding years (*see* Medical Annual, 1928, p. 113). It was a little lower than the rate in 1924, though there were actually 81 more deaths in 1927 than in 1924. From 1923 to 1926 the total rate for these cities had fallen regularly each year, and 1927 marked the first break in the downward trend.

According to H. M. Bundesen,[2] during the first seven months of 1927 50 per cent more cases of diphtheria and nearly 100 per cent more deaths from the disease occurred in Chicago than were recorded for the corresponding months of 1926. This increase in the diphtheria death-rate was due in part at least to a corresponding increase in morbidity, but the major factor was a marked rise in the case fatality, namely 12·8 per cent, during the first seven months as compared with 7·41 per cent in 1926 and 8·0 per cent in 1925. Clinically the type of diphtheria in Chicago during 1927, as in Germany, has been more malignant than for several years past. Severe toxic and septic cases often failed to respond to treatment even when antitoxin was given early and in doses which were usually adequate.

Reports of the prevalence of a malignant type of diphtheria in various European countries, to which allusion was made in the last issue (*see* Medical Annual, 1928, p. 113), continue to be published, e.g., by U. Friedemann[3] in Berlin, W. Steinbrinck[4] in Breslau, Friedberger[5] in the Rhine district, Szirmai[6] and J. von Bokay[7] in Budapest, Bidoli[8] in Padua, and M. Vargas[9] in Barcelona. The prevalence of a malignant type, however, was not universal throughout Germany, as Reye[10] states that during the period 1923–6 inclusive, during which

558 cases of diphtheria were treated in the Rudolf Virchow Hospital in Berlin, with a mortality of 9·3 per cent, 553 cases with a mortality of 7·7 per cent were under treatment at the Eppendorf Hospital, Hamburg. K. B. Meyer and W. Wilke[11] also stated that though a few cases of malignant diphtheria had been observed in six other localities in Prussia besides Berlin, the remaining twenty from which reports had been received had not had any cases of the kind, and in Lüneburg the disease had been particularly mild. According to Friedberger, diphtheria has practically disappeared from Bonn, Frankfort, Leipzig, Marburg, Rostock, Cologne, and Tübingen.

O. Stiner[12] supplies statistics for Switzerland showing that, though there does not appear to be an immediate likelihood of an extensive epidemic of malignant diphtheria in that country, the experience of neighbouring countries should induce practitioners to pay more attention to the disease than they have recently done.

In striking contrast with the malignant type of diphtheria prevalent in Berlin and elsewhere is the benign type occurring at present in London. The mortality from the disease during 1927 in the Metropolitan Asylums Board hospitals was only 4·0 per cent, which, as F. H. Thomson,[13] the chief medical officer of the infectious hospitals service, points out, is the lowest hitherto recorded in the history of the Board.

SYMPTOMS AND COMPLICATIONS.—M. Nathan[14] remarks that *diphtheria without definite membrane* most frequently occurs in infants below the age of six months, when it appears in the form of otitis or inflammation of the umbilicus, but most often as a discharge from the nose. Although the nasal localization of diphtheria was realized by Bretonneau (1821), the only form of nasal diphtheria recognized for a long period was that associated with blood-stained nasal discharge. It was not until 1898 that Hutinel drew attention to the frequency of diphtheria bacilli in the purulent nasal discharge of young children. Later Marfan, Ribadeau-Dumas, and their pupils showed that even the mildest form of nasal discharge might contain diphtheria bacilli. The apparently mild case may develop croup, bronchopneumonia, or more frequently a severe form of infantile diarrhœa, the true nature of which may escape recognition. The clinical features of this form of nasal diphtheria are not distinctive, and the diagnosis can only be made by bacteriological examination.

In an article on *laryngeal diphtheria in old age*, J. D. Rolleston,[15] who records a case in a woman of 76, remarks that laryngeal diphtheria is rare at any period of adult life, and becomes increasingly so with advance in age, as he had shown in a previous paper (*see* MEDICAL ANNUAL, 1918, p. 159). With the exception of a moderate attack in a woman of 94 reported by G. W. Ronaldson (*Ibid.*, 1926, p. 126), the present case was the oldest example that Rolleston had seen in over twenty-seven years' fever hospital experience. The patient was admitted on the sixth day of disease with the tonsils and uvula covered with membrane, which was also visible on the tip of the epiglottis. The cough was croupy and the voice was lost. Twenty-four thousand units of antitoxin were given intramuscularly on admission, and again on the following day. Rapid disappearance of the membrane and laryngeal symptoms took place. Apart from a trace of albumin in the urine no complications ensued, and on her discharge from hospital on the fifty-sixth day she showed no sign of paralysis. The case was remarkable, not only for the rarity of diphtheria in advanced life and the favourable issue, but also for being an example of what C. Zoeller,[16] who has recently reported laryngeal diphtheria in a man of 50, calls "the caprices of spontaneous immunization".

A. J. P. Haye[17] states that *typho-diphtheria*, i.e., the association of typhoid fever and diphtheria, which was first described by Oulmont in 1859, used to be regarded as a rare occurrence, but was fairly frequent during the war. Among 4000 cases of typhoid fever under Joltra n's care in the course of eight months of the year 1915, 120 examples of this combination occurred, and among Rathery's 4197 typhoid patients in the same year there were 109 cases. Since the war typho-diphtheria has been rare. It is essentially a hospital disease, and is due to infection by carriers. It develops when typhoid fever is at its height and the mouth is very dry. It is mainly characterized by general symptoms caused by association of diphtheritic toxæmia and typhoid septicæmia. The symptoms and physical signs are often ill-marked. The complications are those of typhoid fever and diphtheria. Sudden death in particular is liable to occur. Two forms of cachexia may be met with, viz., an acute form which is rapidly fatal, and a chronic form lasting several months which may end in recovery. The diagnosis is fairly easy if the possibility of the combination of the two diseases is borne in mind. The prognosis is grave, and depends on the stage at which treatment is started. Treatment should consist of early, intense, and prolonged administration of diphtheria antitoxin in addition to the ordinary treatment for typhoid fever.

J. F. Prinzing[18] illustrates the rarity of *diphtheria of the penis*, of which he reports a personal case, by the fact that he had found only two previous examples on record, reported by G. Cochrane (*see* MEDICAL ANNUAL, 1922, p. 106) and Bode respectively. Prinzing's patient was a man, age 28, who developed considerable swelling of the penis and a tight phimosis. On retraction of the prepuce severe balanoposthitis was found. Diphtheria bacilli were present in cultures of the penis but not of the throat. Twenty thousand units of antitoxin were given intramuscularly and 10,000 units locally. Immediate improvement took place, and although secondary infection occurred six weeks after admission, recovery resulted. The wife showed a positive vulvar and throat culture and was given 10,000 units of antitoxin. No sequelæ are reported.

L. Lefevre,[19] who reports a personal case, has collected three other examples of *diphtheritic endometritis* from the literature. All presented great tenderness in the lower part of the abdomen, cramp or other abdominal pain, and in one there was hæmorrhage—symptoms which are absent in diphtheritic vaginitis. Lefevre's patient was a woman, age 21, who on the sixth day of recovery from an illegal abortion had a discharge of about a pint of bright-red blood from the vagina, followed by a second severe hæmorrhage a few hours later. As the hæmorrhage continued during the next four weeks, the uterus was removed, and was found to contain a rich growth of diphtheria bacilli and streptococci. Twenty-thousand units of antitoxin were given, and rapid recovery took place without any paralysis. Lefevre recommends that a culture of the uterine cavity should be made in cases of puerperal infection with prolonged fever and a disproportionate increase in the pulse-rate.

T. D. Jones and P. D. White[20] remark that formerly many clinicians considered diphtheria a sufficient cause of various types of *permanent cardiac abnormality*. In recent years, however, with newer methods of study and some changes of interpretation of heart findings, the opinion is gradually gaining ground that if recovery from the acute infection occurs no permanent abnormality of the circulatory mechanism develops. The writers record their observations on 100 young persons, 70 of whom had had severe and 30 mild attacks of diphtheria five to eight years previously. In no case was there any evidence of appreciable chronic effects of diphtheria upon the heart.

A. Querido,[21] who records a case of post-diphtheritic *encephalitis*, remarks that parenchymatous inflammation of the central nervous system is the rarest nervous sequela of diphtheria. The patient was a nurse, age 20, who on the eighth day of an attack of diphtheria complained of severe headache, showed an inclination to vomit, and had slight twitching of the right hand. The knee- and ankle-jerks were brisk, and Babinski's sign was present in the right foot. Lumbar puncture gave issue to a clear and sterile cerebrospinal fluid. The symptoms gradually subsided in the course of the next few days and complete recovery took place. Hæmorrhage and embolism could be excluded by the short duration of the symptoms, and meningitis by the absence of pain and Kernig's sign and the condition of the cerebrospinal fluid. Encephalitis therefore appeared to be the most likely explanation, the lesions being situated in the front part of the left internal capsule.

A. Angarano[22] records a case of *post-diphtheritic chorea* in a girl of 4 years, who about three weeks after an attack of diphtheria, the severity of which is not described, developed right hemiplegia and aphasia with choreic movements in the right upper limb. The cerebrospinal fluid was normal and the Wassermann reaction negative. Improvement took place under large doses of antitoxin, and in a little more than a month the child regained her power of speech and complete use of her limbs, and also recovered from the chorea. Only four other examples of post-diphtheritic chorea have been recorded—by Baginsky, Oulmont, Globus, and Critchley (*see* MEDICAL ANNUAL, 1926, p. 127) respectively. Although his case did not come to autopsy, Angarano was of opinion that the symptoms were due to the action of the diphtheritic toxin on the brain, particularly the basal ganglia and the upper centres of co-ordination and control in the cortex.

C. T. Olcott and J. G. Merselis[23] record a case of *pulmonary gangrene* following severe faucial diphtheria in a girl of 15 years, who died on the twelfth day of disease. The correct diagnosis was made only forty hours before death by the signs of pulmonary consolidation and the foul odour of the breath. There was practically no sputum. X-ray examination showed irregular patchy consolidation scattered throughout both lungs, with areas of cavitation in the right lung. Post mortem the lower two-thirds of the right lung were found to be completely gangrenous. Smears from the lung showed Vincent's organisms, and cultures yielded abundant diphtheria bacilli, hæmolysing streptococci, and staphylococci. No similar case of pulmonary gangrene following diphtheria appears to have been recorded.

DIAGNOSIS.—H. I. Shulman[24] reports a case of Vincent's *infection of the nose* in a boy of 3 years closely simulating nasal diphtheria. The symptoms were a persistent mucopurulent discharge and a greenish membranous slough. The discharge was fœtid and tended to excoriate the skin. The nose was very tender to touch. The condition was accompanied by Vincent's infection of the gums, cervical adenitis, and more or less constitutional disturbance. Only one previous case, reported by Place in 1911, is on record.

PROPHYLAXIS.—J. D. Rolleston[25] states that though fatalities following active immunization have been extraordinarily rare in comparison with the vast number of prophylactic injections given, they have of late acquired an undue prominence. With the exception of a disaster in China where the deaths of 5 out of 81 persons injected were due to streptococcal contamination of toxin-antitoxin, most fatalities were caused by diphtheritic intoxication. The recent report of a Royal Commission[26] shows that the deaths of 12 out of 21 inoculated at Bundaberg, Queensland, in January, 1928, and the illness of several of the survivors, were due to staphylococcal contamination of the toxin-antitoxin mixture. No fatalities have been reported in this country, nor is it likely that they will occur in the future, as the toxin in the mixture has been generally replaced by toxoid, i.e., toxin treated by heat and formalin.

P. S. Rhoads,[27] who records 14 cases of clinical diphtheria in nurses who had received three doses of toxin-antitoxin, states that the persistence of positive

Schick tests in 67·2 per cent of cases, and the occurrence of clinical diphtheria in cases which had been given toxin-antitoxin, is a not infrequent occurrence. The explanation of this disappointing result is that the commercial preparation used is not sufficiently potent. It is therefore necessary that Schick re-tests be done three months after the last dose of toxin-antitoxin and that more immunizing doses be given when they are indicated. When active immunization is to be carried out on a large scale, tests for potency should be made on the particular lot of toxin-antitoxin to be used before the work is undertaken.

G. L. Waldbott[28] reports six cases of asthmatic children who had very severe attacks of asthma coincidently with the administration of toxin-antitoxin. In two other children with an allergic family history the first attacks were brought on by administration of toxin-antitoxin. As diphtheria immunization should not be abandoned in asthmatic or even potentially asthmatic persons, Waldbott recommends the adoption of Besredka's method of giving small desensitizing doses at frequent intervals.

TREATMENT. J. D. Rolleston[25] states that the chief advance in recent times in the treatment of diphtheria is the use of a **Refined Serum,** whereby the incidence of rashes and other unpleasant sequels is reduced to a minimum. Since the employment of this serum at the Western Hospital in April, 1927, the frequency of serum sickness has fallen from 60 to under 30 per cent. The only serum phenomenon now seen is urticaria, which is often limited to the site of injection and is not accompanied by rise of temperature or constitutional disturbance. Circinate rashes, pain in the joints or muscles, cervical adenitis, and pyrexia no longer occur.

While fully convinced of the importance of the early administration of antitoxin, having never seen a death from diphtheria or severe paralysis when antitoxin had been given on the first day of disease, Rolleston denounces the doctrine, which still appears to be widely taught, that antitoxin is of no value after the fifth day of disease. In a series of 3000 cases of which he was in charge throughout their illness, 539 (17 per cent) were admitted after the fifth day. Apart from 12 very mild cases all the patients who had membrane in the nose or throat received antitoxin. Of these, 10 died - a mortality of 5·5 per cent. As the great majority of the patients were children, and every form of the disease was represented, the low mortality cannot be attributed to the patients being adults, or to the mildness of the attack. In the pre-antitoxin era, even when cases were brought under treatment at the very onset of the disease the mortality was never less than 28·8 per cent and often rose to 50 per cent or more, so that the low figure of 5·5 per cent can only be ascribed to antitoxin.

As regards the use of **Alcohol,** to which reference was made in the last issue (p. 117) Rolleston states that in 1927, when no alcohol at all was used in the treatment of diphtheria at the Western Hospital, the case mortality (3·01 per cent) was lower than that of any of the other M.A.B. hospitals, so that this drug does not seem to be so indispensable as some pyretologists maintain.

H. Stanley Banks and G. McCracken[29] report on 300 cases treated by *large doses* of antitoxin mainly *intravenously.* The severest cases received 50,000 units intravenously and 20,000 units intramuscularly on admission, a second dose being given in twelve hours if there was an insufficient response. The moderately severe cases had 20,000 units intravenously and 8000 to 16,000 units intramuscularly, a second dose being occasionally required, while the moderate and mild cases had 8000 to 16,000 intramuscularly. The mortality was 2·6 per cent, and excluding laryngeal cases and patients dying within twelve hours of admission, 1·7 per cent, as compared with a mortality of 9·3 per cent during the period 1911–26. Paralyses were also less frequent and severe than before. Allergic reactions, consisting in rigors, pallor, prostration, weak pulse, cyanosis, and pyrexia, occurred in a large number of cases, but were successfully treated by intravenous or intramuscular injections of adrenalin.

Treatment of malignant diphtheria by the combination of **Diphtheria Antitoxin** and **Antistreptococcus Serum** is recommended by F. Meyer,[30] and H. Finkelstein and E. Königsberger,[31] whose doses ranged from 25 to 75 c.c.

E. S. Platou and C. A. Stewart[32] have found that, in addition to intraperitoneal injection of antitoxin (*see* MEDICAL ANNUAL, 1925, p. 113), **Laryngeal Suction** for removal of membrane is of special value in the treatment of laryngeal diphtheria. It is carried out by means of a laryngoscope through which a plain semi-soft or metal catheter is introduced, the distal portion of which is attached to a suction machine. They state that over a two-year period the incidence of intubation was reduced approximately one-half by this method, which is comparatively simple after practice with the laryngoscope.

Treatment of Carriers.—G. P. Lingenfelter[33] treated 44 carriers, of ages from 5 to 57, with a combination of water-cooled local applications with general body **Radiations** from an air-cooled lamp, exposing the entire person daily, and gradually increasing the dosage so as to build up resistance and increase metabolism. Of the 44 cases, 42 were released with negative cultures after three to twenty-seven treatments varying from 2½ minutes' initial exposure to 20 minutes' final exposure with the air-cooled lamp, to 15 seconds' to 2½ minutes' with the water-cooled lamp. The results appeared to be superior to those obtained by X rays, and very much better than those obtained by any local applications. It is essential, however, that the treatment should be carried out in hospital, where sanitation and personal hygiene can be supervised.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* 1928, xc, 1621 ; [2]*Public Health Rep.* 1927, xlii, 2447 ; [3]*Klin. Woch.* 1928, 433 ; [4]*Med. Welt*, 1928, 327 ; [5]*Med. Klinik*, 1928, 767 ; [6]*Jahrb. f. Kinderheilk.* 1927, cxvii, 234 ; [7]*Deut. med. Woch.* 1928, 1280 ; [8]*Studium*, 1927, 410 ; [9]*Med. de los Niños*, 1927, 321 ; [10]*Deut. med. Woch.* 1927, 1554 ; [11]*Med. Welt*, 1927, 1619 ; [12]*Schweiz. med. Woch.* 1928, 16 ; [13]*M.A.B. Ann. Rep.* 1927–8, 132 ; [14]*Presse méd.* 1927, 1476 ; [15]*Brit. Med. Jour.* 1928, i, 1020 ; [16]*Bull. et Mém. Soc. méd. Hôp. de Paris*, 1928, 426 ; [17]*Thèse de Paris*, 1927, No. 417 ; [18]*Jour. Amer. Med. Assoc.* 1928, xc, 1620 ; [19]*Ibid.* 1015 ; [20]*Amer. Heart Jour.* 1927, iii, 190 ; [21]*Nederl. Tijds. v. Geneesk.* 1928, i, 181 ; [22]*Pediatria*, 1927, 725 ; [23]*Amer. Jour. Dis. Child.* 1928, xxxv, 250 ; [24]*Ibid.* 352 ; [25]*Brit. Med. Jour.* 1928, ii, 337 ; [26]*Ibid.* i, 1076 ; [27]*Jour. Amer. Med. Assoc.* 1928, xc, 254 ; [28]*Ibid.* 290 ; [29]*Lancet*, 1928, ii, 4 ; [30]*Deut. med. Woch.* 1928, 215 ; [31]*Ibid.* 218 ; [32]*Minnesota Med.* 1928, 170 ; [33]*Colorado Med.* 1928, 92.

DROPPED SHOULDER. (*See* PLASTIC SURGERY.)

DROPSY, EPIDEMIC. (*See* BERI-BERI.)

DRUG ADDICTION. (*See* ALCOHOL AND DRUG ADDICTION.)

DUODENAL ULCER. (*See* GASTRIC AND DUODENAL ULCER.)

DUODENUM, CANCER OF. (*See* STOMACH, CANCER OF.)

DYSENTERY, AMŒBIC. (*See* AMŒBIASIS.)

DYSENTERY, BACILLARY. *Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.*

Evidence continues to accumulate to show that bacillary dysentery is more frequent in proportion to the amœbic form than has hitherto been thought in the tropics. [It is worthy of consideration whether this may be due, in part at any rate, to amœbiasis having decreased since emetine has come into general use.—L. R.] Thus, J. A. Manifold and A. J. DeMonte[1,2] publish further careful laboratory work on dysentery and diarrhœa among the troops at Poona in Western India, from which they conclude that water-supply is good and is not responsible for these bowel diseases, but the Indian population in the cantonment suffer much from *B. flexner* infections, from whom the troops are infected all the year round, but especially during the exacerbations of the disease in the seasons of great fly prevalence during the monsoon months, and the spread is favoured by insanitary conditions. House infections of bacillary dysentery are often met with, and mothers are infected while nursing their children, and latent cases are frequent sources of infection. In Bengal, A. C. Ukil and A. K. Sen[3] have also concluded from bacteriological examinations that bacillary is more common than amœbic dysentery, and that organisms of the paratyphoid-enteritis group are more frequently the cause than true dysentery bacilli. R. C. Wats and A. D. Loganadan,[4] among troops in Secunderabad, Hyderabad State, cultivated dysentery bacilli from 46 per cent of cases among the British troops, and in 34·5 per cent in Indian troops, and they also conclude that bacillary disease is far more frequent among them than the amœbic disease. In the Port Blair Settlement, Andaman Islands, on the contrary, A. B. De Castro and V. N. Dueskar[5] found that 40 per cent of their cases were amœbic in nature, and that quite one-third of amœbic infections may be symptomless for long periods, and so are liable to be overlooked. The maximum of both forms occurs during the maximum fly prevalence. In Iraq, J. W. Malcolm and R. Lloyd[6] found the bacillary form to be more common, and to be associated with the presence of bacilli of the Gaertner group. H. Marrian Perry and H. J. Bensted[7] in Egypt have frequently found the *B. dysenteriæ Sonne* in cases of enteritis and enterocolitis in children and adults, and it formed the only causative organism in no less than 35 to 40 per cent of carefully investigated cases. A. Castellani[8] records an elaborate classification of very numerous bacilli which he regards as the cause of dysentery, based mainly on sugar tests, which many authorities now consider of little value in minutely subdividing this group of organisms. A. G. M. Severn and E. W. Evans[9] deal with dysentery in the Smethwick Asylum traced to a *B. flexner* carrier, who appears to have infected some tank water. J. B. Hance[10] has found the sigmoidoscope of value by itself, without bacteriological examinations, in the diagnosis of chronic dysentery of the bacillary type, by revealing extensive superficial ulceration with a strawberry-red, easily bleeding, swollen mucous membrane between the ulcers or alone, which yields to appropriate serum treatment within a few days.

REFERENCES.—[1]*Ind. Jour. Med. Research*, 1928, Jan., 601; [2]*Jour. R.A.M.C.* 1928, June, 401; [3]*Calcutta Med. Jour.* 1927, June, 573; [4]*Ind. Med. Gaz.* 1928, Jan., 13; [5]*Ibid.* 1927, Dec., 667; [6]*Jour. R.A.M.C.* 1927, Aug., 127; [7]*Trans. Roy. Soc. Trop. Med. and Hyg.* 1928, Feb., 417; [8]*Amer. Jour. Trop. Dis.* 1927, July, 199; [9]*Lancet*, 1928, i, 126; [10]*Ind. Med. Gaz.* 1927, Sept., 496.

DYSENTERY, BALANTIDIUM COLI.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

E. C. Cort[1] records twelve cases of this rare bowel infection, in which he gave enemas of 15 min. of **Oil of Chenopodium** in 150 c.c. of olive oil, with the remarkable result that all were cured and remained free from parasites for from nine to twenty-eight months with repeated stool examinations. B. K. Chatterjee[2] records a case in Assam of a man who had symptoms of chronic dysentery for fifteen years and was very emaciated and weak; he treated him with "one 10 gr. powder of **Thymol** every hour, preceded and followed by 2 oz. of **Magnesium Sulphate**, for one day". [? How many doses.] The result was apparently good. F. W. Fox[3] records a case in an infant forty days old, where the parasites disappeared from the stools under 1-drachm doses of magnesium sulphate on three consecutive days, and remained absent for two months.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* 1928, May 5, 1430; [2]*Ind. Med. Gaz.* 1928, Feb., 79; [3]*Trans. Roy. Soc. Trop. Med. and Hyg.* 1927, Aug. 31, 153.

DYSPNŒA, CARDIAC. (*See* CARDIAC DYSPNŒA.)

EAR, DISEASES OF.

A. J. M. Wright, M.B., F.R.C.S.

EXTERNAL EAR.

Furunculosis of the Meatus.—As a result of the successful treatment of one very resistant case of meatal furunculosis with **Diathermy**, J. Hunter[1] suggests its trial in other cases. Tin electrodes 2 in. square were held tightly against the ear and the heat of toleration produced. Treatment was continued for fifteen minutes, and resulted in immediate relief of the pain and rapid discharge. The treatment was continued at intervals for two months and no recurrences have taken place, although previously the individual had been under treatment by other methods for three years.

Hæmatoma of the Auricle.—As the result of his position as Athletic Physician to Cornell University, H. A. Britton[2] has had the opportunity of treating nearly one hundred cases of this injury. He has found that aspiration, with subsequent pressure, gives excellent results, with absence of deformity. The aspiration may be carried out at any time up to five days after the injury, and the subsequent pressure should be maintained for a week. Some moulded form of compress to fit the conformation of the ear must be used in maintaining pressure. Amongst others, he has used copper wire covered with adhesive tape, plaster of Paris, and collodion and cotton.

MIDDLE EAR.

Mastoid Infection in the Infant.—As a result mainly of work in the United States, a new light is being thrown upon the incidence and importance of middle-ear infections in the infant. M. Renaud, in 1921, in a series of seventy consecutive autopsies on infants, found extensive suppuration in the middle ear in all. Histories of these cases did not show ear involvement, but they had been for the most part under treatment for emaciation, with fever, vomiting, and diarrhœa. No lesions in the intestinal tract were found post mortem. He concluded that these infants had really died from middle-ear sepsis with general toxæmia. G. M. Coates[3] points out that these observations raise the question as to whether the condition of the middle ear found at autopsy is due to post-mortem changes, or, if not, whether the middle-ear infection is secondary to the systemic infection or the cause of it. A. M. Alden[4] states definitely that the great majority of cases of so-called cholera infantum, marasmus, and enteritis are due to an acute middle-ear suppuration, with resulting toxæmia. In this class of case, the ordinary signs of mastoid infection—headaches, swelling, etc.—are absent. In addition to the gastro-intestinal syndrome of fever, diarrhœa, vomiting, and wasting, a careful examination of the ears will show some change in the colour and lustre of the membrane, which presents a dirty grey or yellow appearance. Sometimes redness and bulging, or a sagging of the superior meatal wall, are present. Treatment should consist in immediate incision of the membrane, and if improvement is not soon manifested, the mastoid antrum should be drained by operation. General medical treatment is also of the utmost importance. Alden's concluding statement is: At first, cases were operated on only when disaster threatened. Of the first seventeen cases which came to operation, nine recovered. As a result of experience, operation was performed earlier, and of the next nine cases, only three died. Of the most recent forty cases, all but five recovered. It is of the utmost importance that the physician and otologist should combine in the treatment of these cases. F. A. Macneil[5] has come to similar conclusions, and with an experience of operation on thirty-five cases, only two deaths occurred. He points out that these infants stand the operation particularly well.

Treatment of Middle-ear Deafness by Diathermy. - D. McKenzie[6] has found that the use of diathermy in cases of chronic middle-ear deafness frequently results in improvement of the hearing and diminution of the tinnitus. Any effect produced is presumably due entirely to the rise in temperature in the tissues. The region traversed by the current by the method which he advises includes the middle ear and Eustachian tubes, which probably explains why it seems to be most useful in cases of tubo-tympanic catarrh. The method should not be employed in acute suppuration of the middle ear or in patients with Ménière's syndrome. The immediate effect of the application may be some dulling of the hearing and an increase of the tinnitus, but this only lasts for a day or two. It is impossible to say beforehand what cases will benefit, and one must therefore be guided by results. The treatment should be repeated every other day, and, unless improvement has taken place in two or three weeks, it is not worth while continuing.

Method of Application.—The metal electrodes measure 1 in. by 1½ in. One is placed over the mastoid process and the other below the prominence of the opposite malar bone. A pad of several layers of lint soaked in 10 per cent saline is interposed between each electrode and the skin. The patient should be lying down, and close contact of the electrodes maintained with a rubber bandage. The current is gradually raised from zero to from 0·7 to 1·4 amperes, the actual strength being decided by the tolerance of the patient. The current should be allowed to flow for ten minutes, and patients should not assume the erect posture too quickly, otherwise vertigo may supervene.

M. Coelst[7] has also used diathermy, more particularly in cases of Eustachian obstruction. A steel bougie as electrode is passed into the Eustachian tube through an insulated catheter, the indifferent electrode being placed below the corresponding ear. The bougie, which has a small knob on the end, is first passed through the stricture, and a current of 350 ma. is turned on. After three seconds the bougie is slowly withdrawn through the stenosed portion of the tube and the current then turned off. He has treated fifteen cases by this method, and in thirteen which could be followed up improvement resulted. The treated tubes were still found to remain patent after an interval of six months.

Treatment of Tinnitus.—It has been suggested that if bromides are given for this symptom, it should be done in the form of a single dose at night. Also diathermy (*see above*) is stated to be of value. F. P. Stern[8] points out that the local application of **Atropine** to the middle ear will, in some cases, cause great diminution in tinnitus. He quotes three cases in which a perforation in the tympanic membrane was present, in all of which the instillation of a few drops of liquor atropinæ into the ear produced a diminution or cessation of the noises. In two cases of otosclerosis, atropine was used as meatal drops of atropine sulphate gr. 5, dissolved in alcohol and made up to 1 oz. with aniline oil, and the insufflation of liquor atropinæ up the Eustachian catheter. The relief obtained seems to last for days or weeks, and subsequent applications are equally successful.

Complications of Suppurative Otitis Media.—

Facial Paralysis.—This condition may occur as a complication of either acute or chronic middle-ear suppuration, and the nerve may be damaged during the course of a radical mastoid operation. When occurring spontaneously, recovery almost always takes place in the course of some weeks. As a complication of an acute otitis media, it has not necessarily any serious prognostic importance as far as the middle-ear lesion is concerned. Occurring in association with chronic suppuration, however, it is indicative of extension of the disease in the bone and, as a rule, a radical mastoid operation should be performed, to prevent further and more serious complications. Those cases resulting from injury to the nerve at operation do not by any means always clear up. E. F. Buzzard,[9] in opening a discussion on the treatment of traumatic facial paralysis, pointed out that one of the chief difficulties arises from the impossibility of determining whether the nerve has been completely divided or only damaged. The fact that the nerve, at the site of injury, is situated in a bony canal also prevents any operative repair at the site. These traumatic cases may be roughly divided into two groups: In the first are included all those which show even the slightest return to function in the facial muscles after three weeks, and in which the muscles do not show the reaction of degeneration. In these, the function of the nerve has only been temporarily interfered with, and perfect recovery will take place in a few weeks. The second group comprises those in which reaction of degeneration is present at the end of three weeks. In these, no evidence of recovery will be shown until after three or four months, if ever. There is no known means of hastening regeneration of the nerve, so treatment must aim at preserving the nutrition and contractibility, and preventing contractures, of the muscles. **Massage** and **Galvanism** will fulfil the two former objectives. To minimize contractures, a rubber-covered wire, tethering the angle of the mouth to the ear on the affected side, is essential. As soon as any voluntary movement returns, re-educational exercises before a mirror should replace massage and electricity. Buzzard gives six months as the limit beyond which recovery is not likely to take place. In the discussion which followed, this period was generally regarded as being too short, cases being mentioned of recovery after as long a period as three years. It would therefore seem right to allow at least one year to elapse before considering the possibility of carrying out any nerve anastomosis or other operation of repair.

Nerve Anastomosis.—Results obtained do sometimes seem to justify the operation, which, however, must be regarded as still being in an experimental stage. Opinions are divided as to the most suitable nerve to employ. The hypoglossal, spinal accessory, descendens noni, and glossopharyngeal have all been used by various workers.

MENINGITIS.—*Cistern puncture*, as an alterative to lumbar puncture, in both the diagnosis and treatment of meningitis, is gaining ground. Theoretically, it has the advantage of withdrawing fluid from a spot which is usually at, or near, the seat of disease rather than from one at a distance. Experience seems to be showing that its performance is not attended with any undue risk to life. D. Stewart[10] describes his experience as a result of 127 punctures in thirty-two children under 12 years of age. Seventeen of these were cases of meningitis, and fifteen were punctured for diagnosis. The technique is stated to be easy and safe, and the operation can usually be carried out without an anæsthetic. The puncture is made just above the tip of the spinous process of the axis, and the needle is pushed forward in line with the auditory meatus until the point is gripped by the occipito-atlantoid membrane at a depth of 1·5 to 4 cm. On withdrawal of the stylet, fluid should escape. No complications occurred in any of these cases. Cistern puncture is contra-indicated when the cistern is likely to be occluded, as in cerebral tumour or advanced meningitis.

Otto Kroiss and H. Dielmann,[11] as a result of extensive experience, consider that cistern puncture is superior to lumbar puncture in practically all cases. They have performed the operation on ambulatory patients, and do not find it necessary to stop them from working. For diagnostic purposes, 5 c.c. of fluid is removed, but in treatment as much as 38 c.c. has been removed without ill results. In regard to technique, the operation is carried out with the patient on the left side. The needle is inserted through the skin over the spine of the axis and then obliquely upwards towards the occiput. They find the resistance of the occipito-atlantoid membrane to be a more reliable guide than the depth from the surface. They point out that only one death has been recorded out of 2000 published cases. (*See also* CISTERN PUNCTURE.)

BRAIN ABCESSS.—In a short paper C. P. Symonds[12] has given many helpful details in the diagnosis of brain abscess associated with middle-ear disease. In the early stages, the symptoms are those common to retained pus elsewhere, such as fever, rapid pulse, etc., but headache is not commonly severe. This phase either leads directly to a spreading encephalitis, with severe headache, vomiting, and drowsiness, or, more commonly, the infection becomes localized, the signs then depending on the size and situation of the abscess, and not on general toxæmia. In the case of a localized abscess, severe headache, vomiting, drowsiness, and slowing of the pulse are not prominent symptoms in the early stages. Diagnosis therefore has to rely chiefly upon signs of local damage, together with some intermittent headache. Localizing signs have to be considered under the headings of cerebellar, left temporal, and right temporal lobes.

Cerebellar Abscess.—The headache, at first suboccipital, is later generalized or frontal. The symptoms are those of inco-ordination of the movement of the limbs on the same side. This can be most simply demonstrated by the finger-nose-finger test. On the affected side there is a general impression of clumsiness. Another useful test is the falling away of the affected limb when support is withdrawn by the observer from beneath the outstretched hands of the patient. Nystagmus is a valuable sign, but is sometimes missed from not being complete in degree. What should be looked for is a tendency of the eyes to swing away from the side of the lesion. This is best shown by asking the patient to fix his gaze on the observer's finger towards the side of the lesion. The eyes will then be seen gradually to swing back towards the mid-line.

Temporal Lobe Abscess.—In the case of the left temporal lobe, aphasia is of outstanding value in a right-handed person, but may require looking for. It is best recognized by asking the patient to name a large number of familiar miscellaneous objects, when inability to name one or more is evident. The other signs of temporal lobe abscess are common to both sides. Those of practical value are three. The first is a slight weakness of the lower half of the opposite side of the face on spontaneous movement. The second, due to pressure on the pyramidal tract, is an absence or diminution of the abdominal reflexes, increased tendon jerks, and an extensor plantar response. The third sign is not so frequently present, but is of great value when found; it consists in a defect in the superior quadrants of the opposite visual fields, due to interference with the optic radiation.

Cerebrospinal Fluid.—In brain abscess this is clear, and contains a slight excess of cells, under 100 per c.mm., mainly lymphocytes. The protein content is increased, chlorides are normal, and sugar-reducing bodies are present. A definite increase in pressure may be of value as occurring before headache.

Two Rare Varieties of Abscess are also described by Symonds, a superficial abscess and pseudo-brain abscess. The *superficial abscess* consists in a localized collection of pus on the cortex, and is recognized by the occurrence of epileptic attacks, indicating a superficial lesion, with a normal cerebrospinal fluid, indicating a localized one. The importance of recognizing this combination is that the convulsions might otherwise be regarded as the onset of a hopeless meningitis. Two cases which recovered after operation are detailed. *Pseudo-brain abscess* is probably a localized non-suppurative encephalitis. Clinically it is met with as a case in which the symptoms and signs of brain abscess are present but recovery takes place without the evacuation of any pus.

E. M. Atkinson[13] also emphasizes the importance of not waiting for severe headache, vomiting, optic neuritis, etc., as diagnostic signs, as they commonly occur late in the disease. An effort should be made to establish the diagnosis as early as possible. Considered generally, a case of middle-ear suppuration which experiences a short acute illness with an incomplete recovery should be regarded with suspicion. In such a case, mental changes, particularly in the direction of drowsiness and a lack of concentration or a loss of memory, are very important. A general appearance of ill health, with a dirty tongue and poor appetite, combined with intermittent headache, is suggestive. In early cases the usual localizing signs may be entirely absent, and both cranial fossæ may have to be explored.

W. J. Macnally[14] has investigated *the significance of rotation and flexion of the head as a sign of cerebellar abscess or disease.* He finds that this so-called cerebellar posture is not due to any lesion in the cerebellum, but may follow disease of the labyrinth, eighth nerve, pons, mid-brain, or fore-brain. If there is rotation of the head in a cerebellar lesion, it probably signifies pressure on the eighth nerve if the rotation of the head is to the side of the lesion, and on the pons and mid-brain if the rotation is to the opposite side. The rotation of the head is brought about by the influence of the opposite intact labyrinth. It is a crossed effect, the crossing taking place in the cervical region of the spinal cord.

INTERNAL EAR.

Ménière's Syndrome.—Since the description of Ménière's original case, much discussion has taken place as to the exact changes in the labyrinth responsible for the symptoms. J. S. Fraser[15] subdivides cases presenting Ménière's syndrome into three classes: (1) Those with an apoplectiform onset, resulting in total deafness and loss of vestibular function. These may be due to hæmorrhage in leukæmia, diffuse purulent labyrinthitis, or occasionally mumps or congenital syphilis. (2) Those with sudden onset, not, however, followed necessarily by complete deafness or loss of vestibular response. These may be due to a toxic neuritis, herpes, or so-called glaucoma of the labyrinth. (3) Those with a more or less gradual onset, due to cerebral arteriosclerosis, tumours of the eighth nerve, otosclerosis, or the late form of congenital syphilitic deafness. Fraser gives in particular details of the cases due to leukæmia. He states that in bleeding diseases, especially leukæmia, it occasionally happens that hæmorrhage occurs into the labyrinth with the sudden onset of Ménière's syndrome. Examination reveals absolute deafness and loss of vestibular response. Apart from hæmorrhages into the labyrinth, deafness in cases of leukæmia is sometimes due to degenerative changes in the ganglion cells and nerve-endings of the cochlea.

Treatment of Vertigo.—For practical purposes, vertigo is a symptom of a disturbance in the vestibular apparatus. According to F. H. Diggle,[16] treatment must be appropriate to the underlying cause, such as toxæmia, vascular degeneration, etc. **Iodides**, small doses of **Quinine, Hydrobromic Acid,** and **Luminal** will occasionally give some relief. Repeated **Blisters** round the ear are helpful, and small doses of **Perchloride of Mercury** have been advised by Sir Dundas Grant, particularly in cases following head injuries. As a last resort surgical operation may be considered, and destruction of the labyrinth as advocated by Milligan and Lake is sometimes successful, although the operation is not unattended by risk.

Two other types of operation have recently been devised for this distressing symptom. H. Aboulker,[17] in 1913, noticed in two cases that lumbar puncture diminished the vertigo associated with a non-suppurative labyrinthitis. As a result of this observation he tried a decompressing trephine behind the mastoid process, with success. Since this, he has obtained successful results in six cases. He does not consider that it is of importance whether the dura mater is opened or not. He concludes that in some cases Ménière's syndrome is not due to a lesion within the labyrinth, but to an increase in tension of the cerebrospinal fluid in the posterior fossa. He suggests that the favourable results obtained by Portmann from his operation, described below, are due to the decompression rather than to the opening of the endolymphatic space.

The second operation has been devised by G. Portmann.[18] He states that the saccus endolymphaticus situated between the layers of the dura on the posterior surface of the temporal bone is in direct relation through the ductus endolymphaticus with the cavity of the labyrinth. He therefore conceived the idea that by opening the saccus, any increase of intralabyrinthine tension might be relieved, and in the few cases so far operated on there seems to be some justification for this view. Access is obtained to the saccus by an opening through the bone of the mastoid in the triangular area limited above by the floor of the antrum, in front by the aqueductus Fallopii, behind by the lateral sinus.

Labyrinthitis due to Hair Dye.—Laurens first drew attention to the fact that some hair dyes containing paraphenylenediamine not only may produce a dermatitis, but may also have a toxic action on the labyrinth. E. Watson-Williams[19] relates an illustrative case. The patient, a woman, age 33, had suffered with noises and deafness in the left ear, with giddiness, for more than a year. Examination showed complete nerve deafness on the left side, with an absence of response to caloric stimulation. The observation of a rash round the neck, limited to the skin above the dress, suggested the possibility of a toxic factor. Examination of a brown fur collar, which she was wearing frequently, showed the presence of paraphenylenediamine.

REFERENCES.—[1]*Jour. of Laryngol. and Otol.* 1927, Aug., 424; [2]*Jour. Amer. Med. Assoc.* 1927, ii, 112; [3]*Ann. of Otol. Rhinol. and Laryngol.* 1927, Dec., 913; [4]*Laryngoscope*, 1927, Oct., 766; [5]*Canad. Med. Assoc. Jour.* 1928, June, 688; [6]*Lancet*, 1928, i, 597; [7]*Ibid.* 1927, ii, 240; [8]*Jour. Laryngol. and Otol.* 1927, July, 449; [9]*Ibid.* 437; [10]*Edin. Med. Jour.* 1927, Jan.; [11]*Munch. med. Woch.* 1926, July 23, 1227; [12]*Jour. Laryngol. and Otol.* 1927, July, 440; [13]*Lancet*, 1928, i, 483; [14]*Jour. Laryngol. and Otol.* 1928, July, 484; [15]*Ann. Otol. Rhinol. and Laryngol.* 1927, March, 361; [16]*Practitioner*, 1927, Aug., 92; [17]*Presse méd.* 1927, Nov. 19, 1412; [18]*Jour. Laryngol. and Otol.* 1927, Dec., 809. [19]*Lancet*, 1928, i, 1123.

ECLAMPSIA. (*See* PREGNANCY, TOXÆMIA OF.)

ECZEMA.

A. M. H. Gray, M.D., F.R.C.P., F.R.C.S.

In a lecture recently given under the title "*eczémas microbiens*", R. Sabouraud[1] takes the opportunity of reviewing some of his previous work on three types of eczematous reaction.

First he deals with the nature of simple pityriasis of the scalp, which he believes to be due to the 'spores of Malassez' (*see also* DERMATITIS SEBORRHŒICA), and its development into pityriasis steatoides, which he considers due to the added infection of the "coccus à culture grise, porcelainée", otherwise known as the "coccus cutis communis", or, by Unna, as the morococcus. To this affection Sabouraud now gives the name of "morococcides eczématiformes". For local treatment he recommends the following ointment:—

℞	Oil of Cade	10 parts	Lanoline	10 parts
	Vaseline	10 parts	Precipitated Sulphur	1 part

This is applied at night and washed off in the morning.

Secondly he refers to the form of dermatitis frequently spoken of as retro-auricular intertrigo, a common and extremely troublesome condition which is liable to spread to the scalp. This form he believes to be always due to the streptococcus, and he has given it the name of "streptococcides eczématiformes". He believes that in the treatment of this condition a full and nourishing diet is necessary, and that much time should be spent in the open air, preferably at the sea. For local treatment, if discharge is abundant, he gives **Alibour Water** (containing zinc and copper sulphates, but not in greater strength than 1–200) applied frequently, up to twenty times daily. When the lesions are dry he uses applications of **Iodized Alcohol** 1 per cent once daily and the following ointment at night:—

℞	Neutral Coal Tar, washed	5 parts	Vaseline	20 parts
	Lanoline	5 parts	Zinc Oxide	3 parts

This is cleaned off with yolk of egg the following day.

The third type referred to by Sabouraud occurs in fat overnourished men from the age of 40 to 45 upwards. Some of the subjects have had furunculosis of the neck. These patients develop intense pruritus of the scalp, generally at night. On examination, a number of red points are found scattered over the scalp, situated round the hair follicles, and sometimes, though rarely, showing a miliary pustule or a minute amber crust. Cultures show on each point a colony of *Staphylococcus aureus*. This eruption is often mistaken for an eczema, but is, in reality, a miliary acne necrotica. The lesions clear up rapidly with the following ointment:—

℞	Precipitated Sulphur	1 part	Hydroquinone	1 part
	Yellow Oxide of Mercury	1 part	Vaseline	30 parts
	Resorcin	1 part		

To prevent recurrence, however, it is necessary to put the patient on a strict régime: bread, fats, and alcohol must be completely forbidden (biscuits and fresh butter allowed). On this diet the patient should lose about 500 grm. a month, and at the end of three months the eruption will cease to recur and the patient's physical condition will be much improved. Sabouraud names this affection "staphylococcides eczématiformes".

Infantile Eczema.—K. Scheer[2] has treated cases of infantile eczema and allied conditions with **Milk acidified with Hydrochloric Acid.** He finds this preferable to the usual sour milk preparation, as the acid does not undergo combustion in the process of digestion. In order to avoid careless mixing, he has had a special concentrated acid milk prepared under the name of 'Cutanmilch'. This is normally diluted with two parts of water before use, but in small infants it may be still further diluted with three or four parts according to age. The pH value of the normal sample is 4·5. A series of fourteen cases are quoted showing the effects of this treatment. In general, doses of from 200 to 600 c.c. are given daily, and although improvement is often rapid, it is advisable to continue the treatment for four to six weeks.

J. D. Pilcher[3] has found that great relief from itching in infantile eczema can be obtained from hypodermic injections of **Epinephrine.** During the last two years he has treated seven infants, and relief was obtained in about three-quarters of the cases. It is particularly valuable in getting the child off to sleep, and usually relieves the itching completely in about two minutes. Doses of from 0·1 to 0·8 c.c. of a 1–1000 solution have been given without harmful effects, though occasionally pallor of the face and extremities was noted. It is not suggested that the drug should be used in mild cases.

REFERENCES.—[1] *Presse méd.* 1928, May 5, 563; [2] *Münch. med. Woch.* 1928, May 18, 852; [3] *Jour. Amer. Med. Assoc.* 1927, ii, 110.

ELECTRICAL ACCIDENTS. *Sir W. I. de C. Wheeler, F.R.C.S.I.*

B. J. Harrison,[1] writing in the *Medical Journal of Australia*, concludes :—

1. That all lecturers in forensic medicine should be asked to emphasize the value in cases of electrical shock of artificial respiration, as carried out according to Schäfer's method, laying very careful stress on the necessity for continuing the procedure for as long as four hours.

2. That all first-aid classes, ambulance classes, Red Cross Societies, life-saving bodies, and such associations should be asked to include a special mention of the value of Schäfer's artificial respiration in cases of electrical accidents.

3. That compulsory instruction in safety methods, and especially in Schäfer's method of prone resuscitation, by means of lectures, motion pictures, posters, etc., should be given to all employees in the electrical industries. That such instruction should include actual practice of the prone method of resuscitation each week for all employees.

Pages 8 to 17 of the rules for resuscitation from electrical shock by the prone pressure method, issued by the National Electrical Light Association, could be very well used as a basis for instruction in Schäfer's method.

4. That a box of suitable equipment, including oxygen-carbon-dioxide inhaler, such as that mentioned, should be kept at all power houses and sub-stations.

5. That a system of licensing should be introduced to ensure that all electrical work be done only by men who have been properly trained.

6. That electrical engineers should be asked to draw up safety rules suitable for local conditions, comparable to the rules now existing in England and America.

7. That safety committees should be formed to keep constantly before everyone the dangers of electrical accidents and to see that safety methods are adopted in all branches of electrical work, in addition to organizing the training of employees as indicated in 3.

8. That the State should be asked to introduce legislation ensuring the safety of all locally manufactured electrical equipment, and that the Commonwealth should be asked to exercise a similar supervision for all electrical imports.

9. That employers should appoint someone specially interested in electrical accidents to investigate each and every case occurring among their employees, for the purpose of securing uniformity of treatment and improvement of results.

He states that there is ample evidence that the absence of the usual signs of life in a patient the subject of an electrical shock is not to be interpreted as indicating that death is instantaneous. There is a considerable interval of time in practically all cases between the onset of apparent and the moment of real death.

Schäfer's method of artificial respiration is as follows :—

As soon as the patient is clear of the circuit quickly feel with the finger in his mouth and throat and remove any foreign body (false teeth, etc.). If the mouth is tightly shut, pay no more attention to it until later. Do not stop to loosen the patient's clothing, but immediately begin actual resuscitation. Every moment of delay is serious. Proceed as follows :

1. Lay the patient on his belly, one arm extended directly overhead and the other bent at the elbow and with the face to one side, resting on the hand or forearm so that the nose and mouth are free for breathing.

2. Kneel straddling the patient's hips with knees just below the patient's hip-bones or opening of trousers pockets. Place the palms of the hands on the small of the back with the fingers over the ribs, the little finger just touching the lowest rib, the thumb alongside the fingers, the tips of the fingers just out of sight.

3. While counting one, two, and with arms held straight, swing forward slowly so that the weight of your body is gradually but not violently brought to bear upon the patient. This act should take from two to three seconds.

4. While counting three, swing backward so as to remove the pressure, thus returning to the former position.

5. While counting four, five, rest.

6. Repeat these operations deliberately, swinging forward and backward twelve to fifteen times a minute—a complete respiration in four or five seconds. Keep time with your own breathing.

7. As soon as this artificial respiration has been started, and while it is being continued, an assistant should loosen any tight clothing about the patient's neck, chest, or waist. Keep the patient warm.

8. Continue artificial respiration without interruption until natural breathing is restored, if necessary four hours or longer or until rigor mortis has set in. If natural breathing stops after being restored, use resuscitation again.

The use of a mixture of **Carbon Dioxide and Oxygen** in a specially devised inhaler has a great influence in preventing the relapse of the patient once natural respiration has been established. But nothing else should be troubled about until the patient takes his first few natural breaths.

The patient should be kept warm. Blankets will not warm him if he is already cold. He must of course be covered, but **Artificial Heat** (warm botties, warm blankets, etc.), should be employed. **Ammonia** is a stimulant when applied after the establishment of natural respiration.

Hypodermic injections will not induce respiration, but **Camphor in Olive Oil** is helpful as a stimulant. When respiration is fully established attention can be given to the wounds, the best treatment consisting of the application of **Vaseline** or **Olive Oil** on soft clean cloth. Clothing should be cut off, if necessary leaving some adherent rather than forcibly removing them. Splints should be fastened to the damaged limbs by bandaging the healthy parts only. Blisters should remain untouched.

REFERENCE.—[1]*Med. Jour. of Australia*, 1924, Sept. 24, 439.

EMBOLECTOMY. (*See* VASCULAR SURGERY.)

EMBOLISM. (*See* LUNG, EMBOLISM OF; VASCULAR SURGERY.)

EMPYEMA. (*See also* CHEST, SURGERY OF.) *John Fraser, Ch.M., F.R.C.S.Ed.*

David Parker,[1] in an article entitled "Treatment by Closed Methods and Suction Drainage", recognizes how important is the distinction between the synpneumonic (non-adherent) and the metapneumonic (adherent or encysted) varieties. He delays operation in the synpneumonic type until he has succeeded by repeated aspiration in converting it into an effusion of an encysted variety, and thereafter employs a kind of closed drainage. Using the intercostal route and local anæsthesia, he incises the tissues and enters the pleural space by an incision large enough to admit a catheter, size 24 F or 27 F. Previous to the operation a piece of rubber dam or sleeve of a rubber glove about three inches square is perforated in the middle and drawn over the catheter. The dam is then tied around the catheter about 1½ to 2 in. from the tip. This makes a shield which is approximated to the chest wall when the catheter is in position. After introduction of the catheter it is clamped as soon as pus begins to escape from it. The skin incision is closed, and the rubber dam is smoothed down against the chest wall and secured in place by strips of adhesive plaster. A syringe is attached to the catheter, and aspiration of the pus is continued until the child coughs or complains of discomfort.

Thereafter the catheter is connected by glass and rubber tubing with a five-pint glass bottle partially filled with fluid, the end of the catheter connecting tube passing beneath the fluid so as to constitute a water seal. Perhaps the most important part of the after-treatment (it is certainly that to which Parker attaches supreme importance) is the repeated irrigation of the pleural cavity with 1 per cent **Chlorozone Solution** or **Dakin's Solution**. Eighteen children under the age of ten years had been operated on since 1921, with one death.

John V. Bohrer[2] describes his method of treatment in 154 cases. During what may be termed the formation stage repeated aspirations are carried out, and when the presence of pus is established intercostal drainage is instituted under local anæsthesia. A 'Flapper' tube is the drainage medium, and it is interesting that, in contrast to the view expressed in the last-mentioned paper by Parker, Bohrer attaches little importance to the use of Dakin's solution. Irrigation is employed once daily, but more as a means of maintaining the lumen of the drainage tube than as a specific solvent of inflammatory material; in fact the author gives a warning that the unrestricted use of Dakin's solution may be responsible for the development of a bronchopleural fistula. The powerful tissue-solvent action of the chloramine group of antiseptics is well known, and it is important that we should keep in mind the influence they may have on surrounding tissues when the fluid is imprisoned and in contact over a period of time with friable and infected parts.

The paper contributed by C. E. Farr and M. L. Levine[3] may be described as a statistical study of a peculiarly valuable type. There is the premise that empyema in the adult and in the child are two entirely different problems, and that, if we are to get our best results, we must regard them as such, and treat them accordingly. In support of this statement the fact is pointed out that age is an influence of supreme importance in the ultimate mortality, that the death-rate from empyema in children under one year of age is four times that of children in the fourth year of life. A total of 371 cases is considered, and they are analysed in respect of age, organism, year of incidence, etc., all in terms of mortality. In every instance the disease was secondary to a pneumonia, and, as influences in the etiology, the fact is brought out that general hygiene and social status play their part in the incidence of the condition; the preponderance is among the poorer classes.

The greatest age-incidence falls between the second and seventh years; the reason why the first year does not enter into the category is ascribed to the fact that, while pneumonia is frequent during this period, the severer types prove fatal before empyema has had an opportunity to develop. The mortality in respect of age is illustrated by various groups of statistics, but the vital lesson is conveyed when one appreciates that the mortality in the first year reached 66 per cent, that in the second year it was exactly half this figure (33 per cent), that from the first to the end of the sixth year the mortality figure was 22 per cent, while from the sixth to the fourteenth year it fell to 10 per cent. These are facts and figures of supreme importance in prognosis.

The variability of the mortality in different years is an important aspect of the disease. For example, the authors record that no death occurred in the period 1922–3, while in the period 1925–6 the mortality reached 46 per cent. The answer to the apparent anomaly lies in the fact that the intensity or virulence of infection varies greatly from one period of time to another.

An interesting statistical column records the mortality in respect of the organism concerned. The pneumococcal and the streptococcal infections are each associated with a mortality of 26 per cent; in mixed infection the mortality figures are 42 per cent; in staphylococcal infection the death-rate is 66 per cent. The last high figure was to be expected, for a staphylococcal septicæmia is one of the most fatal of all diseases, but we are surprised that the percentage incidence of staphylococcal empyema is so high. In our experience this type of etiology is extremely uncommon. It is suggestive that in the first year of life such a high percentage of pleural infections is due to the streptococcus; the explanation offered is the fact that bronchopneumonia of the streptococcal type is the most frequent pulmonary infection of this age period.

Where *treatment* is concerned the authors confine themselves to the open method. Preliminary aspiration was common to all cases, and the procedure was continued as long as the fluid remained serous or thin. Thereafter open drainage was instituted, either by rib resection (168 cases) or by intercostal incision (58 cases).

In the end, however, after discussing procedures and quoting the figures and mortality-rates of advocates of the open and of the closed methods, the authors arrive at the conclusion that open drainage or closed drainage, irrigation or simple drainage, rib resection or intercostal route, have little influence upon the prognosis. If methods so widely different show a uniform result, it would seem that we have yet to discover the best.

REFERENCES.—[1]*Boston Med. and Surg. Jour.* 1927, Oct. 20, 683; [2]*Amer. Jour. Surg.* 1927, Sept., 232; [3]*Surg. Gynecol. and Obst.* 1928, Jan., 79.

ENCEPHALITIS, EPIDEMIC.

Sir James Purves-Stewart, K.C.M.G., C.B., F.R.C.P.

TREATMENT.

The treatment of encephalitis is largely dependent on the stage of the disease, whether acute or chronic, early or late. In the early acute stage we endeavour to attack the infective agent and to relieve the urgent and dangerous symptoms, whereas in the chronic or late stage, where permanent organic changes are already present in the central nervous system, our chief endeavour is to palliate symptoms such as insomnia, Parkinsonism, etc.

Early or Acute Stage.—The ideal treatment would be by administration of a **Specific Antiserum** obtained from an immunized animal. Such a serum has been described by E. C. Rosenow[1] in 1923, and later by A. C. Evans and W. Freeman[2] in 1926, and favourable results have been reported from its use. Freeman[3] has since employed specific serum treatment in 9 acute cases, in 1 Parkinsonian case, and in 3 relapsing acute cases. His cases have only been under observation for a year or less, so that it is too early to draw definite conclusions as to ultimate results. So far, however, no fresh case of Parkinsonism has appeared in this series and all the uncomplicated cases show notable improvement. Freeman, however, candidly admits that his results may be partly due to a non-specific protein effect, for he records that intravenous injection of **Normal Horse Serum** in one case, of **Antipneumococcus Serum** in another, and of a **Streptococcus Vaccine** in a third, have had the same beneficial effect as had the anti encephalitis serum. **Blood Transfusion** from a healthy human donor is another method worth trying, and Freeman records the case of a woman with acute encephalitis in whom, in spite of repeated anti-encephalitis serum injections, status epilepticus supervened and the patient appeared moribund. Lumbar puncture showed the cerebrospinal fluid to be under increased pressure. At this stage 500 c.c. of blood was transfused from her own brother, and within the next few hours she began to improve and ultimately made a complete recovery.

Amongst medicinal remedies during the acute stage, the best results have been obtained by the administration of salicylates in large doses. The most convenient way is to give daily intravenous injections of pure crystalline **Sodium Salicylate** in a 10 per cent solution, in doses of 4 grm. (60 gr.) at a time, for two or three successive days and repeated in a week or ten days. By the intravenous route the drug is innocuous, and is more efficacious and more rapidly absorbed than when given orally, without the disadvantage of gastro-intestinal irritation. Vedel, Puech, and Pagès[4] in France, H. J. MacBride and E. A. Carmichael[5] in England, and various other observers have recorded a number of cases successfully treated in this fashion. Colloidal substances—e.g., **Colloidal Silver, Colloidal Gold,** or **Colloidal Iodine**—have also been tried from time to time, whilst favourable results in the acute stage have also been reported from the bactericidal action of **Trypaflavine,** as used in a series of 40 cases by E. Marx,[6] of Ahrweiler, in doses of $\frac{1}{20}$ grm. ($\frac{3}{4}$ gr.) every other day intravenously for six successive doses. He claims that, even in Parkinsonism, amelioration of the muscular rigidity is often obtained.

Once the initial fever and acute symptoms have subsided, it is important to search for and remove any intercurrent sources of infection in the teeth, tonsils, accessory nasal air sinuses, etc., and to administer an autogenous vaccine from any incriminating organism that may be discovered.

Chronic or Late Stages.—The late manifestations of the disease, as already described, are as truly encephalitic in origin as tabes dorsalis and paralytic dementia are manifestations of chronic syphilis. The treatment in this chronic stage is to some extent a continuation of that in the earlier phase, inasmuch as efforts should be made to eradicate the persistent infection, e.g., by autogenous vaccines, by injections of foreign proteins, and so on. B. R. Tucker[7] talks enthusiastically of intrathecal injections of the **Patient's own Blood Serum. Malarial Inoculations** have also been tried, but P. K. McCowan and L. C. Cook,[8] in a series of 15 cases, report that in none of them was any benefit secured. H. N. Jaffe,[9] of Nottingham, treated 40 successive cases of Parkinsonism by means of **Violet Rays,** applied by general body radiation for ten minutes twice a week for six or seven successive weeks, aiming at producing a definite second or even third degree of erythema at each dose; 35 cases out of 40 are stated to have been markedly improved, as shown by diminution of tremors and rigidity, diminution of excessive salivation, improved sleep, and increased bodily and mental vigour.

Turning to drug treatment of chronic post-encephalitic Parkinsonian rigidity, it is the experience of most physicians that drugs of the belladonna group, **Belladonna, Hyoscine, Scopolamine,** etc., are, so far, the most useful in alleviating the symptoms, although their action can only be palliative. Hyoscine hydrobromide may be given either subcutaneously or by the mouth. When given by subcutaneous injection its effects are more powerful, whilst by the mouth its action is longer sustained. It is wise to commence with small doses, say $\frac{1}{150}$ gr. per day, gradually increased to $\frac{1}{50}$ gr.. By the mouth we commence with $\frac{1}{100}$ gr. and increase if necessary to $\frac{1}{50}$ gr., given just after meals, since if taken before food it is apt to make the mouth dry and render mastication and deglutition difficult. Hyoscine treatment of this sort may be continued for years on end without discomfort to the patient and with considerable alleviation of the muscular rigidity. Belladonna treatment has been strongly advocated by A. J. Hall, of Sheffield, and undoubtedly constitutes a most valuable means of alleviating Parkinsonian rigidity. It must be given in suitably large doses, steadily increased until the optimum dose for each individual is found, i.e., one which alleviates his rigidity without causing tachycardia or other signs of atropism.

ENCEPHALITIC RESIDUA, PHYSICAL AND MENTAL.

It is now a decade since cases of epidemic encephalitis have become relatively numerous, so that a considerable amount of clinical and pathological experience has been accumulated, not only as to the acute disease, but as to its residual phenomena. It is recognized that although the virus has a predilection for the corpus striatum and for the brain-stem in the region of the mid-brain, no part of the nervous system is immune. Hence the polymorphic clinical features of the disease. In the acute phase of the disease, the most constant symptoms are fever, diplopia, drowsiness or insomnia, delirium, and ptosis. There is generally a great predominance of motor over sensory disturbances.

PHYSICAL RESIDUA.—Turning to the physical sequelæ or residual phenomena, the most common disability in adult patients is the *Parkinsonian syndrome*. This may appear rapidly during the acute phase of the illness, or, more commonly, it develops slowly and progressively. The rigid expressionless face, the staring eyes with infrequent blinking, the rigidity of the limbs, often asymmetrical, the interosseal attitude of the hand and absence of swing of the upper limb in walking, the smallness of the handwriting (so-called micrographia), are all characteristic. To these may be added involuntary movements of various kinds. Involuntary movements in encephalitic Parkinsonism rarely if ever occur as the sole manifestation of the disease, being commonly associated, as G. Riddoch[10] has emphasized, with symptoms such as emotional instability or restlessness, especially at night, minor pyramidal or extrapyramidal signs, oculomotor defects, or respiratory disorders of various sorts.

Mme. Lévy[11] has classified the *involuntary movements* of encephalitis lethargica as follows: (1) *Choreiform movements*. (2) *Bradykinetic movements*, i.e., slow regular rhythmic movements, often of considerable amplitude, twisting athetoid movements of the trunk or limbs; torticollis; and grimacing. These are relatively uncommon. (3) *Myoclonic movements*, which may appear early or late in the disease. Sometimes they are accompanied by severe pain and cutaneous tenderness of radicular distribution. The contractions are rhythmical and may be as frequent as 40 to the minute. They may involve part or whole of a muscle or sometimes a muscle-group. They are usually not strong enough to displace the affected segment of the limb. The upper abdominal muscles are often affected. When they affect the diaphragm, the result is hiccup. (4) *Tremors*: these appear chiefly as a complication of the Parkinsonian syndrome. Unlike the tremor of the degenerative form of paralysis agitans, post-encephalitic tremor occurs, as a rule, only on voluntary movement or during the maintenance of an active static posture. (5) *Tics*: these are of innumerable variety, e.g., shuffling and stamping movements of the feet, ocular or glossal spasm, complex automatic movements of the whole body, and the various respiratory tics.

Post-encephalitic respiratory disorders have been classified by W. A. Turner and M. Critchley[12] into three groups: disorders of rate, disorders of rhythm, and respiratory tics.

Disorders of rate include *tachypnœa* and *bradypnœa*. Both of these are usually paroxysmal, the attacks varying in duration from a few minutes to several hours. When the rate is increased, perhaps up to 60 or 100 per minute, the breathing as a rule is shallow and not necessarily distressing to the patient. Sometimes, however, breathing is deep as well as rapid, and in such cases tetany may develop from over-ventilation of the lungs. When an attack of tachypnœa ceases, it is followed by a period of either bradypnœa or apnœa before a normal respiratory rate is resumed. In bradypnœa the respiratory rate may fall as low as 6 per minute with deep and noisy breathing.

Disorders of respiratory rhythm include such symptoms as *sighing*, or of paroxysmal *holding of the breadth*. This latter is a dramatic affair which may be frequently repeated, especially towards evening, and may even occur during sleep. After a few deep breaths the patient holds the chest in full inspiration for as long as half a minute. The head is thrown back; the face may be cyanosed, and various grotesque movements of the limbs may be performed during the respiratory pause.

Respiratory tics include such symptoms as hiccup, yawning, dry barking cough, sniffing, hawking, sneezing, and so on. These are commonest in patients of school age, who in addition show changes in character and are subject to nocturnal excitement.

Curious tonic spasms of the ocular muscles are occasionally met with: so-called *oculogyre crises*. These consist of sudden tonic deviation of the eyeballs, mostly upwards, or upwards and to one side, lasting from a few seconds up to several hours. Similar *tonic spasm of the masticatory muscles* is also met with, occurring during meals, so that the patient suddenly becomes unable to open his mouth until the spasm passes off; or the masticatory spasm may occur when there is already food in the mouth, in which case he sticks with his jaws half open.

Spastic paralysis from pyramidal lesions and various *localized muscular atrophies* from nuclear disease are rare, but have been well described by Riddoch and others. *Endocrine disorders* such as adiposity with or without disturbance of the sexual functions have also been met with fairly often.

Lastly, Riddoch directs special attention to an *asthenic syndrome*, a not uncommon occurrence, in which the constant and main feature is intense physical enfeeblement and weariness. Unlike myasthenia gravis, the feebleness is not appreciably diminished by rest; and unlike neurasthenia the patient does not tend to feel better as the day goes on. This syndrome is common in most Parkinsonian cases, but may occur independently as the sole or main disability.

During the past year a valuable report written by A. C. Parsons has been published by the Ministry of Health,[13] dealing with the after-histories of persons attacked by encephalitis lethargica. The first part contains a critical analysis of the records of some 3000 patients, i.e., about one-fifth of the total number of cases notified in this country during the seven years ending in 1926. This analysis shows that, out of every 100 cases investigated three years after the primary attack, an average of 25 patients will have survived without serious consequences, 35 will have died, whilst 40 will have some permanent disablement—physical, mental, or both. It is with the ultimate fate of this 40 per cent that the rest of the report is mainly concerned, in the hope of riveting attention on the serious consequences of the disease and the necessity for their special consideration.

An important difficulty in this connection is the imperfect notification of the disease. This is readily understood. Firstly, the disease is comparatively new, having only been well recognized in this country since 1917, since when its symptoms have gradually become familiar to the general practitioner. Moreover, the insidious onset of the malady in many cases, and the slightness of its initial symptoms, render it liable to be overlooked. Epidemicity hardly exists except in large centres of population, and sporadic cases are easily missed. Many patients, in fact, consult a doctor for the first time when they are already suffering from late effects of the disease. In this way many of the missed cases, even when ultimately recognized, are not formally notified. The Health

Department of the London County Council recently discovered within its boundaries no fewer than 260 children suffering from residual phenomena of encephalitis lethargica who had never been notified. Parsons estimates that, for every 100 cases notified, there are from 50 to 75 which escape notification. The causes of imperfect notification also help to explain local differences in mortality. For example, in the year 1924, which was noteworthy for a marked epidemic form of the disease (although far the least fatal of the nine years under review), Parsons explains the low mortality figures in Sheffield and Glasgow, as compared with Newcastle and Lancashire, by differences in the extent to which mild cases of the disease were recognized and notified.

Another difficulty is that a patient, after recovering quickly from a mild attack of encephalitis lethargica, may remain well for months or sometimes years and may then develop sequelæ, serious and even ultimately fatal. In proportion to the comparatively small number of persons who are attacked by the disease, there is probably no infectious or contagious malady in this country which produces such severe consequent disablement as does encephalitis lethargica. And although the residual symptoms in children are deplorable and have attracted much attention, Parsons shows that its effects on adult wage-earners are sometimes equally bad. The case of the dribbling 'old man of 15', rigid in face and limbs and slowly dying of Parkinsonism, is paralleled by that of the intelligent workman similarly affected who loses job after job and eventually drifts into some Poor Law institution or asylum.

MENTAL RESIDUA.—The mental sequelæ of encephalitis lethargica have been variously classified. Thus Mapother divides them broadly into three groups: (*a*) morbid restlessness, specially in children under 8 years of age, (*b*) demoralization, as in the post-encephalitic juvenile criminal or 'apache', occurring in juveniles between 8 and 20, and (*c*) mental anergia and apathy, commonest in those over 20 years of age. Parsons prefers a still broader grouping, into the depressed and the excitable. He finds that about 27 per cent of those who suffer from encephalitic sequelæ show symptoms of mental impairment. Children show signs of restlessness and excitement more frequently than do adults, in whom the reactions tend to be passive and negative. Perversion of conduct is commoner in children, whilst mental confusion, dementia, and melancholia are more usual in adults.

P. K. McCowan and L. C. Cook,[14] of West Park Mental Hospital, Epsom, from a study of 120 certified cases and 24 cases of mental deficiency, classify post-encephalitic cases into four main groups:—

1. *Bradyphrenic*, showing a slowness of mental activity analogous to the slowness of voluntary movements (bradykinesia) in patients with Parkinsonian symptoms. All degrees of bradyphrenia are found, ranging from mild retardation to marked lethargy.

2. *Depressed Type*.—This, the commonest variety, is sometimes a mere reactive depression consequent on the realization of the gravity of his disease and the prospect of a life of chronic invalidism from Parkinsonian rigidity. In other cases there is agitated depression, with mental confusion, motor and psychical restlessness, obsessional delusions, and even hallucinations. Milder varieties in this group are merely hypochondriacal, whilst others may be classed as psychasthenics with the characteristic obsessional impulses and doubts, together with feelings of inadequacy and infirmity.

3. *Paranoid Type*.—This is the smallest of the four groups, amounting to about 10 per cent of the certified post-encephalitic cases. In the absence of the ordinary signs of Parkinsonism, the antecedent factor of encephalitis may easily be overlooked, and the cases mistaken for ordinary paranoia (systematized delusional insanity) or for dementia præcox. The chief distinguishing

mental symptom in the encephalitic patient is a curious periodicity in the activity of the delusions, so that the patient has intervals, longer or shorter in duration, during which he can be temporarily persuaded that his beliefs are delusional. Another characteristic is that, with the advance of bradyphrenia, all paranoid symptoms may gradually disappear.

4. *Apache Type.*—This is characterized by delinquency and bad conduct, varying in degree from mischievousness to serious crime. This syndrome is seldom found in patients who have passed adolescence at the time of the primary attack. But the apache symptoms may continue indefinitely. Children of irreproachable family, hitherto of exemplary behaviour and character, may within a short period after an attack of encephalitis become guilty of all kinds of delinquency, from mere naughtiness to cruelty and murder, and from mild bad habits to gross indecencies. In these patients motor restlessness is a striking feature and may be responsible for the numerous cases of 'wandering' as well as for their pugnacity. These patients often exhibit curious motor tics of the face, limbs, etc. They sometimes have periodic outbursts of acute excitement, lasting several days at a time, during which they are specially noisy, destructive, violent, and sometimes hallucinated.

After-care and Control.—The problem of after-care and control of disabled post-encephalitic patients is difficult. In the acute stages of the disease there is little or no difficulty in securing treatment in the general hospitals. The risk of direct infection to other patients or to the nursing staff is very slight. But when once the acute stage of the disease is over, the encephalitic patient is no longer welcomed in an ordinary hospital ward, his bed being required for more urgent cases. Nevertheless the unfortunate patient is unfit to resume his normal occupation, and in many cases is unfit even for home life. What is to become of him? In some parts of the country, e.g., in Brighton, special benevolent societies exist which may either board out the patient in a carefully chosen family or may assist in securing training and employment suitable for his limitations. Or the local education authorities may allocate cases of post-encephalitic mental retardation to a special school, or even, as in the case of the Metropolitan Asylums Board, to a special 'encephalitis lethargica unit'. If the degree of mental impairment is such as to render the patient certifiable, he will come under the Board of Control as an insane patient, whilst other patients suffering from encephalitic mental affections come under the Poor Law authorities. But all the foregoing loop-holes may be escaped, and the unfortunate patient, often a juvenile offender, falls into the hands of the police on account of some criminal offence. Fortunately, magistrates usually recognize the true state of affairs and try to deal with these cases by referring them either to reformatories or to Borstal educational institutions.

The question of disposal of difficult mental cases is governed by two considerations: (*a*) the age of the patient, (*b*) the nature and extent of his incapacity. At the school-going age it is impracticable to keep the post-encephalitic child at an ordinary school. He distracts the attention of the other children and impairs the general discipline of the class. Even if he goes to a special school for backward children the post-encephalitic child imposes a severe strain upon the teachers. In many cases, therefore, committal to a reformatory or industrial school becomes necessary.

In adolescents, the post-encephalitic 'apache' is a difficult problem. When his period of detention and reformatory training is over, he is liable to relapse if he is sent to his own home. If he is transferred to a Poor Law institution, the guardians, unless they adopt him, have no power to retain him unless he wishes to be detained. Moreover, the power of adoption only applies so long as the patient is under 18 years of age.

In the majority of older patients the problem is usually a domestic one. Medically speaking, the degree of mental disablement is the determining factor in the disposal of the patient. Unfortunately certification is rarely possible, except after a long and tedious period of progressive mental or physical deterioration. Parsons considers that the great difficulty is in those patients who by reason of profound mental disturbance, or in consequence of serious moral delinquencies, require special supervision and control, in their own interests and for the protection of society. It is especially in the case of the juveniles in this class that the difficulty arises, bearing in mind their unfortunate influence upon the other inmates of an institution. He therefore leans to a solution of the problem of the treatment of the post-encephalitic patient by the establishment of a larger number of special institutions for the supervision and study of their physical and mental disabilities. In such an institution the patients would, of course, be sorted out into different groups and not mixed together indiscriminately.

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J. D. Rolleston, M.D.

EPIDEMIOLOGY.—R. Bing[1] emphasizes the prevalence of epidemic encephalitis in Switzerland by the following figures: From 1920, when the disease was first made notifiable, until 1926, 1597 cases were notified, exclusive of 250 cases of epidemic hiccough, which were probably abortive forms of the disease. During the same period 93 cases were notified in the Canton of Basle alone. These figures, however, are considerably below the reality, and a more probable estimate would be 500 for the Canton of Basle and 4000 to 4500 for the whole of Switzerland.

SYMPTOMS AND COMPLICATIONS.—R. Cruchet[2] records in full the cases observed by him in 1917, when he gave the first description of the disease and adopted the following classification, which still holds good: (1) A mental form in which the cerebral torpor, amnesia, lack of orientation, changes in the pupils, tremor, dysarthria, paraphasia, and changes in the cerebrospinal fluid at first suggested general paralysis. (2) A convulsive form in which there was a succession of fits, which constituted a transient status epilepticus. (3) A chronic form with all the features of infective chorea in the adult. (4) A meningeal form in which meningeal symptoms such as rigidity, Kernig's sign, pain in the back, somnolence, and vasomotor phenomena were not explained by any hitherto known factor. (4) A hemiplegic or hemiparetic form which, owing to its rapid disappearance, was quite different from the ordinary hemiplegia of the adult. (5) A pontocerebellar form with ptosis, conjugate deviation of the eyes, and titubation, and a simple cerebellar form closely resembling cerebellar tumour. (6) A bulbopontine form with various nuclear lesions chiefly affecting the fifth, seventh, tenth and eleventh cranial nerves. (7) An acute ataxic form. (8) An anterior poliomyelitic form resembling infantile paralysis.

E. Marx[3] states that *changes in character and personality* are typical of the disease in children and young persons and are rare in adults. Up to 1924 he had had only two examples among his patients, who were all between the ages of 20 and 40. Since 1924, however, he had had 10 cases among 82 patients, so that psychical changes among adult encephalitis patients seemed to be on the increase. These changes took the form either of depression or of euphoria in which the patient failed to recognize the gravity of his condition. A small group complained of lack of concentration and loss of memory.

A. Puche[4] remarks that in spite of the frequency with which the mid-brain is affected in epidemic encephalitis, *alternate syndromes* are rare. A few examples of upper alternate syndromes have been recorded, some consisting in a typical Weber syndrome (paralysis of the limbs and of the hypoglossal nerve on one side and of the oculomotor nerve on the other) and others in Benedikt's syndrome (paralysis of oculomotor nerve on one side with paresis and tremor on the other). Examples of lower alternate syndromes arising from the pons are more numerous. Some of these are purely paralytic and are represented by a typical Millard-Gubler syndrome, while in others paralytic symptoms are associated with a variety of involuntary movements, such as myoclonus, tremors, or athetosis. Three cases have been described of Foville's syndrome (crossed paralysis of the limbs on one side and of the face on the opposite side with loss of power to rotate the eyes to that side). Alternate syndromes appear at a late stage of encephalitis, and their subsequent course is dissociated. The paralytic symptoms are usually transient, whereas the involuntary movements are often remarkably persistent.

I. Cisler[5] records his observations on 14 cases of chronic encephalitis, the great majority of which presented *disturbances of articulation and phonation*. Speech was accelerated, scanning, low, hesitating, or more or less incomprehensible. In most cases the face was masklike and motionless, the muscles of the lips being particularly affected. The tongue, whether protruded or not, showed certain movements ranging from fine fibrillary quivering to a well-marked tremor. The patient was frequently unable to protrude the tongue normally, and in 3 cases there was hemiparesis of the organ. In 8 cases the palate showed defective movements giving rise to a nasal voice. In 6 cases motor involvement of the larynx was observed. There was a rigidity of the vocal cords just as in paralysis agitans, where the action of the adductors predominates and extreme abduction takes place slowly.

G. Laurès[6] remarks that, since they were first described in 1923, numerous examples of *tonic spasms of the extrinsic ocular muscles* in epidemic encephalitis have been recorded. They may occur at all stages of the disease, being affected by emotion and fatigue, and are accompanied by a feeling of anguish and vago-sympathetic manifestations. Their duration varies from a few seconds to twenty minutes. All the muscles may be affected, but those turning the eye upwards are most frequently involved. No previous writer, however, has drawn attention to the painful sensations sometimes accompanying the spasm in the affected muscles, for which reason he prefers the term 'cramp'.

Pain is a well recognized symptom of epidemic encephalitis. It may be localized in certain viscera and simulate various affections, such as appendicitis, as in the case reported by Cautiero,[7] renal colic, or intestinal obstruction, until the appearence of hiccough or myoclonic movements in other muscles than the diaphragm reveal the true nature of the disease. These pains have a predilection for the abdominal viscera, but they may simulate angina pectoris, as in the cases reported by Laubry and J. C. M. Fournier, A. Garra, F. Rocca, and Monestier.[8]

R. G. Abercrombie[9] draws attention to the occurrence of *spinal curvatures* (anteroposterior or lateral) following epidemic encephalitis and due to a localized contraction of the prevertebral muscles, which in turn is probably caused by lesions in the mid-brain, substantia nigra, and lenticular nucleus. Treatment by corrective apparatus was followed by material improvement.

F. Roques,[10] in his M.D. Cambridge thesis on *epidemic encephalitis in association with pregnancy, labour, and the puerperium* based on a study of 21 cases and a review of the literature, comes to the following conclusions: (1) Pregnancy is not usually affected by concomitant Parkinsonism. In a series of 34 collected pregnancies including the author's series, 27 (81·5 per cent) went satisfactorily to term. Premature birth near full term is only of occasional occurrence, and is limited to the more severe cases. (2) Labour is easy in Parkinsonian patients, and is associated with less pain than in normal women. (3) Puerperal complications are very uncommon.

H. Pigeaud,[11] who reports two cases, remarks that epidemic encephalitis is a rare complication of pregnancy but may occur at any stage of gestation. The course of the disease does not appear to be affected by gestation or by interruption of pregnancy, and the life of the child is in no way endangered when the mother survives. Pigeaud's cases were exceptional in that death of the fœtus in utero took place in the third and seventh month of pregnancy respectively.

Diagnosis.—F. Floyd and J. F. Landon[12] summarize as follows the conditions which may simulate epidemic encephalitis:—

I.—*Inflammatory lesions*: (*A*) Of the brain tissue—(1) Other forms of encephalitis: (*a*) acute post-epidemic encephalitis, (*b*) hæmorrhagic encephalitis, (*c*) acute serous encephalitis, (*d*) polio-encephalitis. (2) Local septic lesions, such as abscess, septic thrombosis, or embolism. (3) Tuberculous lesions. (4) Syphilitic lesions such as gummata, cerebrospinal disease, or general paralysis. (*B*) Of the pia mater, such as purulent meningitis, tuberculous meningitis, syphilitic meningitis, or meningitis due to other causes. (*C*) Of the ependyma, including serous, purulent, and tuberculous ependymitis.

II.—*Primary vascular lesions (non inflammatory)*: (*A*) Hæmorrhage into the brain tissue from pia or dura or large intracranial vessels. (B) Arteriosclerotic stenosis causing local ischæmia or local brain softening.

III.—*Intracranial tumours*, primary or metastatic.

IV.—*Conditions without easily recognized or typical lesions*: (*a*) Intoxications, including uræmia, meningism, alcoholism, lead poisoning, and gastro-intestinal intoxication in children; (*b*) Increased intracranial pressure with resulting ischæmia due to trauma or nephritic œdema; (*c*) Early insanity, such as dementia præcox or manic-depressive states.

E. Marx[3] illustrates the ignorance prevalent in the profession relative to chronic encephalitis lethargica by the fact that of 50 cases treated at the Ahrweiler Asylum in the last seven years, 32 had been admitted with a wrong diagnosis. In mild cases the diagnosis had been neurasthenia, nervous debility, or hysteria, while pronounced cases of hyperkinesis or Parkinsonism had frequently been certified as neurasthenia with choreiform movements and hysteria, post-influenzal nervous debility, post-infective psychoses, hysterical lethargy, arteriosclerosis, and tabes with negative findings in the blood and cerebrospinal fluid.

G. Guillain and A. Alajouanine[13] point out that other affections of the nervous system than encephalitis can give rise to an oculo-lethargic syndrome, such as syphilis of the base of the brain, amyotrophic lateral sclerosis, and disseminated sclerosis. In disseminated sclerosis in particular during the acute or subacute stage the clinical picture may closely simulate that of epidemic encephalitis. The somnolence may assume various forms, but as a rule is more or less permanent, and is usually accompanied by other signs which render the resemblance to epidemic encephalitis more complete, such as diplopia, strabismus, ptosis, headache, and asthenia.

Prognosis.—According to Bing[1] the prognosis depends on the patient's age. The younger the individual, the greater the hope of a gradual recovery, whereas the more advanced the mental development at the time of the attack of encephalitis, the less favourable is the prognosis.

T. P. Sprunt[14] found that the probability of the development of a Parkinsonian syndrome varied with the severity of the symptoms of onset. The syndrome ensued in 77 per cent of those with a severe onset, in 57 per cent of those with a moderate onset, and in only 28 per cent of those in whom the onset was mild. Of 35 patients who were followed up, 12 were able to work, 22 became chronic invalids, and 1 committed suicide.

H. Dennig and R. Voellm[15] investigated the subsequent history of all the patients who had been treated in the Heidelberg Medical Clinic for epidemic encephalitis from 1919 to 1923, and found that the great majority of those who were still capable of work or were suffering from only slight disabilities in 1923 had not become any worse three years later. On the other hand, the patients who were showing signs of deterioration in 1923 had become still worse in 1926, as shown by an aggravation of rigidity, tremor, and absence of all initiative.

TREATMENT.—G. Winkler[16] has tried to influence the sequelæ of epidemic encephalitis by **Physical Exercises,** in the hope that by exercising hitherto unaffected nerve centres and tracts they may take the place of those whose function has been lost. In the treatment of Parkinsonism **Psychotherapy** must be associated with orthopædic treatment. The success in each case will depend on the patient's previous intelligence, temperament, and agility.

Marx[3] attaches considerable value to intravenous injections of **Trypaflavine,** which possesses not only a stimulant but also an antiseptic action.

Roques[10] maintains that encephalitis must be treated as such apart from the complicating factor of *pregnancy.* Interference with the natural course of pregnancy is not to be advocated, for the following reasons: (1) Neither miscarriage nor labour causes any alteration in the course of encephalitis in the great majority of cases; (2) Conservative treatment has been carried out in most cases with remarkably good results.

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ENDOCARDITIS.

A. G. Gibson, M D., F.R.C.P.

John Cowan[1] gives a clinical review of acute endocarditis which contains a very careful analysis of 207 cases. It should be read in the original, but it may here be noted that in 103 out of 207 cases the cardiac condition was either not realized or overshadowed by other disorders. In this non-cardiac group occur terminal infections or those consequent upon disease elsewhere, e.g., lobar pneumonia. A number of cases labelled 'acute rheumatism' failed to show signs of endocarditis. The symptomatic types fall into four groups—(1) septicæmic, (2) septicæmic and cardiac, (3) cardiac, and (4) nervous, including meningitis, strokes, paraplegia. Amongst skin complications urticaria, erythema, Osler's nodes, nodules, and petechiæ are described. One case had nodules the size of a hen's egg.

In the same journal J. N. Cruickshank[2] reports on 11 cases of acute endocarditis in a series of 160 consecutive post-mortems on women who died during pregnancy or in the puerperium. In 2 endocarditis was a terminal event, in 4 it was secondary to infection elsewhere, and in 2 it developed after an attack of cardiac failure due to a previous attack of endocarditis. In 8 only was puerperal sepsis the cause of the endocarditis.

O. H. P. Pepper[3] finds the following characters of the blood-count in endocarditis from *Streptococcus viridans* in a series of 20 cases. Anæmia is constant if the duration has been long, and tends to increase as the disease progresses; it is of the chlorotic type. The leucocyte count is within normal limits, but rises with infarction, thrombosis, or other complications.

It is not always wise to take a positive blood-culture with cardiac signs as indicating a bacterial endocarditis. H. V. Gloor[4] reports a case of a woman age 24, with an old mitral stenosis, who suffered from an acute tonsillitis; puncture of the tonsils produced the *Streptococcus viridans*, which was also recovered from the blood. The author suggests that similar cases of transitory septicæmia with *Streptococcus viridans* have been responsible for the reports of cases that have undergone healing in endocarditis lenta.

L. N. Hurxthal[5] reviews the clinical features of *subacute bacterial endocarditis* in 65 cases with 39 positive blood-cultures and 24 post-mortems. Three-quarters of the cases had symptoms referable to the respiratory system, and, as gross infarction is relatively rare, it was found in 3 autopsies only. The author suggests, without being able to prove it, that some of the numerous smaller infarctions may affect the bronchial arteries. In this series the earlier diagnoses have included chronic lung infections, empyema, bronchiectasis, and subphrenic abscess. Clubbing of the fingers did not occur in the absence of enlargement of the spleen except in one case. Precordial pain usually occurred in aortic lesions only. Normal rhythm was the rule, and the author suggests that auricular fibrillation is against a diagnosis of subacute bacterial endocarditis. Ten cases had complications of the nervous system, giving clinical pictures of meningitis, abscess, and tumour. The condition of the cerebrospinal fluid in these cases suggests a mild septic meningitis. The clinical diagnosis of the disease rests essentially on the presence of embolic phenomena in various parts of the body.

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ENDOCRINOLOGY. (*See* OBESITY; OVARIAN HORMONES; PARATHYROIDS; PITUITARY; SUPRARENALS; THYROID.)

ENURESIS IN CHILDREN.

Reginald Miller, M.D., F.R.C.P.

The vast majority of cases of this distressing condition, as seen in private and hospital practice, fall into the 'functional' category, showing no physical signs and no obvious cause for the disability. Some physicians, indeed, put the percentage of cases without physical signs as high as 90 per cent; this is probably an overstatement, as perseverance can elicit some minor form of local irritation which may be responsible in a fair number of cases, and there is a small group in which enuresis is only an incident in grave organic disease. Apart from the cases associated with gross mental defect, renal or spinal disease, or congenital abnormalities, which do not concern us here, the children are for the most part brought to the doctor with enuresis as the sole complaint, or with some vague tale of 'nervousness' or naughtiness, with or without worms in addition. Many of these patients are of the neurotic type, and in these it is probable that enuresis is filling the rôle occupied by tics, night terrors, and similar afflictions in other unstable children; indeed it is not uncommon to find the subject of enuresis displaying other manifestations of an unbalanced nervous system. There is, however, a group of stolid, unemotional children whose appearance may tempt the parents to attribute the wet beds to laziness; this is the type of case in which the administration of small doses of **Thyroid Extract** is sometimes remarkably successful.

The history is of importance in investigating cases of enuresis. Observers are agreed that there is a very strong hereditary and familial element, as

J. K. Calvin[1] and D. Paterson[2] have pointed out, and this may be some consolation to the parents if they can reflect that they or their elder children successfully outgrew the complaint. It is far more common in boys than in girls, and in the unstable than in the placid types. Usually the condition dates from birth, clean habits having never been acquired; sometimes an illness in early childhood has thrown the patient back and the incontinence has persisted, though continence had previously been attained; and in a few cases a severe fright or illness in later childhood may provoke the onset of bed-wetting in a formerly clean child. These cases are the most satisfactory to treat, as nervous control, having been firmly established for many years, can usually be restored in a few weeks by suitable tonic or sedative treatment. It must not be forgotten that enuresis may be a manifestation of latent chorea. In most cases the enuresis is nocturnal only, but it may occur by day also, and is then often associated with precipitancy. When there is also incontinence of fæces, the questions of gross mental or spinal disease arise.

Associated conditions on which stress is often laid are phimosis or adherent prepuce, vulvovaginitis, thread-worms, constipation, enlarged or infected tonsils and adenoids, and highly acid or concentrated urine. Any of these may contribute to the persistence of enuresis, but it is undeniable that their correction often leaves the condition quite unchanged. Actual infection of the urinary tract itself (cystitis, pyelitis) is, of course, another matter, and where enuresis is due to this its cure runs hand-in-hand with that of the organic disease.

Treatment.—Treatment is tedious and discouraging, but the outlook is on the whole hopeful, as the great majority of cases recover spontaneously with advancing years. The group of cases due to gross organic defects can only be dealt with via the original disease and do not fall within the scope of this article. For the 'functional' cases which we are here discussing there are three main lines of treatment: (1) Domestic (the most important); (2) General measures; (3) Drugs.

1. *Domestic.*—The routine of the child's home life may need adjustment. If there is diurnal frequency, this should be combated by making him retain his urine for increasing periods with the idea of re-establishing bladder tolerance. This practice should not be pushed to the point of actual discomfort. No fluids should be taken after tea-time, and tea as a beverage as well as coffee should be forbidden. Some cases have been attributed by H. C. Cameron[3] to acidosis, and it may be worth while to increase the carbohydrates in the diet while avoiding excess of fat. The child must be made to urinate at bed-time, and should be awakened when the mother comes to bed and made to empty the bladder again; in very intractable cases it may be necessary to make him urinate three or four times during the night till control becomes established. All authorities are agreed that reprimands and punishment for regrettable incidents are to be condemned, but praise and little rewards for success are very helpful.

2. *General Measures.*—These consist in the correction of any possible source of irritation or instability. Local inflammations and phimosis must be dealt with, but indiscriminate circumcision without definite indication is not to be recommended; similarly, the removal of normal tonsils (if any such exist) should not be undertaken on the chance of their being the cause of the affection. Often enough the removal of infected and enlarged tonsils and adenoids is followed by little or no improvement in the condition for which advice was originally sought, but it should not be neglected. Intestinal worms and other derangements of the bowels should be treated on the usual lines, every effort being made to raise the tone of the patient's general health to the highest possible level.

3. *Drugs.*—The only drug that is of any practical importance in the treatment of 'idiopathic' enuresis is **Belladonna.** This does seem to have some effect in diminishing the irritability of the bladder in many cases, and if it is employed it must be pushed to the verge of intolerance; one may start with 7 to 10 min. of the tincture thrice daily, rapidly increasing to larger doses. Some physicians use **Strychnine** in addition, but this is probably of use only in the cases following on debilitating illness. Similarly, the **Bromides** may be of some service in the case of very excitable children whose sleep is restless, and **Alkalis** in the cases associated with highly acid urine. In a few children of the heavy, lethargic type, benefit is occasionally obtained from that overworked remedy **Thyroid Extract**; but far more commonly this drug has a definitely harmful effect. When bed-wetting is a manifestation of rheumatic infection **Salicylates** should be given; as already mentioned, the treatment of enuresis occurring as a symptom of some definite disease depends on the treatment of that disease itself, and as the general condition improves this symptom will also clear up, often without the employment of any remedies aimed directly at the bladder.

As a final resource in very intractable cases **Institutional Treatment** may be advised, and this almost invariably proves successful, at least during the child's sojourn in hospital, though in most cases he undergoes no 'treatment' other than the routine of ward life. Where the trouble is associated with faulty home management, relapse is apt to occur after the patient is discharged, but in many cases the cure remains permanent.

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EPIDERMOPHYTOSIS. (*See* SKIN, FUNGOUS AFFECTIONS OF.)

EPIDIDYMIS, AFFECTIONS OF. (*See* TESTICLES AND SEMINAL VESICLES.)

ERYSIPELAS.

A. M. H. Gray, M.D., F.R.C.P., F.R.C.S.

D. Symmers and K. M. Lewis[1] have made observations on the treatment of erysipelas by **Antitoxin.** Following the work of Birkhaug, they treated 111 cases of facial erysipelas with a specific erysipelas antitoxin, while 92 cases of the same condition were treated by ordinary methods without antitoxin. Their figures show that the patients' stay in hospital was reduced by somewhat over 53 per cent in the antitoxin-treated cases. Similarly, twenty cases of body erysipelas were treated with antitoxin in comparison with fifteen similar cases by other methods, with like results. They find that, taking the whole series together, the percentage of deaths in antitoxin cases was 5·3 per cent, as against 11·2 in those treated without antitoxin; the average number of days in hospital in antitoxin cases was 5·6 days, in the non-antitoxin cases 12·1 days. They recommend the intramuscular route in preference to the intravenous, and inject 25 c.c. on the patient's admission to hospital, repeating the dose at intervals, usually twenty-four hours, until the erythematous blush disappears, the œdema is dissipated, and the temperature is normal. Sometimes a single injection suffices, more frequently two are necessary, and occasionally amounts up to 100 to 150 c.c. have been given in all to a single patient.

REFERENCE.—[1]*Jour. Amer. Med. Assoc.* 1927, ii, 880.

J. D. Rolleston, M.D.

ETIOLOGY.—G. F. Dick and G. H. Dick[1] refer to their experiments in 1921 and 1923 in which they had produced a sore throat without an exanthem in volunteers by swabbing pure cultures of hæmolytic scarlet fever streptococci over the tonsils and pharynx. They now report experiments in which hæmolytic streptococci obtained from the skin lesions of erysipelas produced on inoculation acute angina in three out of five volunteers. The attacks were characterized by fever, leucocytosis, and the general clinical picture of ordinary sore throat, without the skin manifestations of erysipelas. All made an uncomplicated recovery.

TREATMENT.—E. S. Platou, F. W. Schlutz, and L. Collins[2] record their observations on 155 cases of erysipelas, 35 of which were treated with **Local Applications**, 80 with **X Rays**, 30 with **Erysipelas Antitoxin**, and 10 with **X rays and Antitoxin Combined.** The efficacy of X rays was shown by prompt return to normal temperature and the more rapid disappearance of symptoms such as pain, toxæmia, and general malaise. Extension of the disease occurred less frequently in the irradiated group (21 per cent) than in the control group (68 per cent). The mortality in the X-ray group was only one-fourth (23 per cent) that in the control group, in spite of the fact that the former included twice the number of infants under three years of age that were in the control group. There was less tendency for the disease to spread in those treated with serum (46 per cent) than in those treated with local applications (68 per cent), and the mortality among patients treated with antitoxin was about one-fourth that of the controls. The writers conclude that antitoxin and X rays are both of definite value in the treatment of erysipelas. X rays seem to be specially effective in inhibiting the spread of the disease and producing a prompt subsidence of temperature and alleviation of symptoms. The success obtained from the combined use of antitoxin and X rays in 10 severe cases indicates that probably the best form of treatment is the intravenous, intraperitoneal, or intramuscular administration of antitoxin combined with X-ray irradiation of the involved area and contiguous normal skin.

Marceron and Willemin[3] record three cases in adults in whom œdema following erysipelas was successfully treated by application of **Ultra-violet Rays.**

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* 1927, lxxxix, 1135; [2]*Amer. Jour. Dis. Child.* 1927, xxxiv, 1030; [3]*Rev. d' Actinologie*, 1927, iii, 373.

ERYTHEMA INFECTIOSUM.

J. D. Rolleston, M.D.

J. Cathala and H. Cambassédès[1] report an outbreak of five cases of erythema infectiosum or fifth disease in a family of seven children. The ages of the patients ranged from 3 to 13 years; the other two children, age 18 months and 8 years respectively, escaped. The disease was obviously contagious, the cases succeeding one another at intervals ranging from one to four days. A food rash could be excluded, as the children were attacked successively and not simultaneously. The possibility of a drug rash could also be dismissed, as no medicine had been given. Measles could be eliminated by the absence of constitutional disturbance and Koplik's spots, and rubella by the initial localization of the eruption on the cheeks and neck, its character which was at first morbilliform and then circinate, its recurrence, and the absence of any enlargement of the cervical glands.

REFERENCE.—[1]*Bull. et Mém. Soc. méd. Hôp. de Paris*, 1928, 205.

ERYTHEMA MULTIFORME.

A. M. H. Gray, M.D., F.R.C.P., F.R.C.S.

Levaditi, in collaboration with Nicolau and Poincloux, described the discovery of a streptobacillus (named by them "*Streptobacillus monilliformis*") in a case of erythema multiforme. C. Levaditi[1] now calls attention to the observations of E. H. Place, L. E. Sutton, and O. Willner,[2] in which they describe an epidemic of papular erythema multiforme associated with arthralgia, fever, and sore throat. Blood cultures made by F. Parker and P. Hudson demonstrated an organism which they call "*Haverhillia multiformis*" and which Levaditi claims to be identical with his *Streptobacillus monilliformis*. The organism is found in various forms: oblong cocci, bacilli isolated or in chains, non-capsulated and non-sporing, measuring 2 to 3 μ long and ½ μ broad, and Gram-negative. Parker and Hudson classify it in the family of Mycobacteriaceæ, order Actinomycetales.

REFERENCES.—[1]*Presse méd.* 1928, Jan. 18, 65; [2]*Boston Med. and Surg. Jour.* 1926, Feb., 285.

EXANTHEMA SUBITUM. *J. D. Rolleston, M.D.*

SYMPTOMS AND COMPLICATIONS.—H. K. Faber and L. B. Dickey,[1] from observations of 26 cases and a study of about 550 more recorded in the literature, conclude that the view is erroneous that exanthema subitum exhibits no pathological symptoms apart from the fever and eruption. While in the majority of cases the disease runs a mild and relatively uneventful course, symptoms of considerable severity may occur especially affecting the nervous system, such as malaise, drowsiness, insomnia, severe headache, and even generalized convulsions. In a large proportion of cases definite evidence of a nasopharyngeal infection is present. The disease may be communicable, with an incubation period as short as three or four days. Otitis media, suppurative adenitis, and pyuria are occasional complications.

A. P. Bramstein[2] records five cases recently seen at Charkow, thus giving the first description of exanthema subitum in Russia. The patients were from 7 to 19 months old; three were males and two females. In all but one the temperature kept high for three to three and a half days, reaching a maximum of 103·6°. The eruption, which was morbilliform, appeared on the fourth day simultaneously with the fall of the temperature, without leaving any trace. It was generalized, but most pronounced on the trunk, especially the back. No complications or sequelæ were observed. The blood picture was characterized by a leucopenia, relative lymphocytosis, and diminution of the polymorphonuclear cells. Bramstein's cases therefore closely corresponded with the description given by the American writers (*see* MEDICAL ANNUAL, 1923, p. 406), as well as with those of Glanzmann and von Bokay (*Ibid.* 1925, p. 141).

REFERENCES.—[1]*Arch. of Pediatrics*, 1927, 491; [2]*Jahrb. f. Kinderh.* 1928, cxviii, 386.

EXOPHTHALMIC GOITRE. (*See* THYROID.)

EXTRASYSTOLES. (*See* ARRHYTHMIA.)

EYE AFFECTIONS, GENERAL. (*See also* CATARACT; CONJUNCTIVA, DISEASES OF; CORNEA, DISEASES OF; GLAUCOMA; OPTIC NERVE, AFFECTIONS OF; RETINA, AFFECTIONS OF.)

Lt.-Col. A. E. J. Lister, I.M.S. (retd.).

Lysozyme, an Antibacterial Body present in great Concentration in Tears, and its relation to Infection in the Human Eye.—A paper by F. Ridley,[1] to whom the reviewer is indebted for an advance copy, was thought by several speakers in the discussion which followed it, in the Ophthalmic Section of the Royal Society of Medicine, to be of great importance, and possibly to point the way to new methods of treatment of eye infections. It was introduced by the author as follows: "Lysozyme, which was described by Fleming in 1922, is an enzyme which is able to destroy not only the non-pathogenic bacteria, but also most of the organisms pathogenic for man and the lower animals. It is very widely distributed in nature, being found in all animal tissues and tissue fluids and in most of the secretions. It is present in high concentration—in such concentration, indeed, as is destructive for many of the pathogenic

bacteria—in the tears, polymorphonuclear leucocytes, nasal mucus, and sputum of man. This being so, it must be of the greatest importance in the defence of the normal individual against bacterial invasion. The occurrence of a marked fall in the lysozyme concentration in disease (such as I have been able to demonstrate in the tears in infection of the eye) may throw new light on the cause, natural means of cure, and possible treatment of bacterial infection." Only a few points from this paper can be mentioned ; it should be read in its entirety.

Some idea of the power of lysozyme as an antiseptic may be conveyed by the observation that 1 grm. of the pure enzyme would confer the characteristic power of dissolving a suspension of *Micrococcus lysodeicticus* upon 100 million gallons of normal saline. [The author, when reading his paper in London, demonstrated this by adding a tear-drop to a test-tube full of a cloudy solution of *M. lysodeicticus*. It instantly became clear.—A. E. J. L.] Lysozyme (tears) was compared with a large number of antiseptics in dilutions which can be employed therapeutically. To do this small discs of filter-paper, each soaked in an antiseptic, were embedded in agar, and the plate was planted thickly with *M. lysodeicticus*. *No antiseptic tested compared with the enzyme in its power to inhibit the growth of this organism.* The bactericidal power of the enzyme was tested against staphylococci, streptococci, pneumococci, and various other organisms. From the results obtained it was concluded that a normal eye containing the normal concentration of lysozyme would be immune to infection by the particular strains of the organisms tested. The result for pneumococci (which were at their maximum virulence for mice) was striking, since they grew normally in three-quarter tears, but were killed by whole tears. It would appear that the concentration of lysozyme in normal tears is only a fraction higher than that necessary to act effectively on pathogenic bacteria. A fall in the lysozyme content of the tears always accompanies epiphora lasting more than a few hours. In five cases of a foreign body contained in the eye for more than three days the concentration of lysozyme was 45 per cent less than in the healthy eye. There is some evidence that the beneficial effect of atropine on the eye is due to its action in reducing epiphora, and in consequence causing an improvement in the concentration of lysozyme. This reduction of epiphora is due partly to the paralysing effect of atropine on the lachrymal gland itself, and partly to its action as a mydriatic, whereby reflex stimulation of tear secretion is diminished. The author concludes by saying that Metchnikoff was wrong when he stated that " Nature does not use antiseptics ". Nature, he says, does provide, especially in the tears, a very efficient antibacterial substance, lysozyme, to which must be attributed an important rôle in the prevention of, and recovery from, bacterial infection. *Plate XXIII* shows graphically the bactericidal power of the tears and its destruction by boiling.

[One can only look forward to the further work which is being done on this fascinating subject, the scientific and practical importance of which is obvious to all. To the meditator on the wonders of nature, the fact that the tears are a more efficient antiseptic than those antiseptics usually employed in eye work will afford food for thought.—A. E. J. L.]

Severe Eye Trouble caused by a Drop of Vaccine Lymph.—Delord and Villard[2] relate a case which should interest those who carry out vaccinations. A medical man, whilst cutting a tube of vaccine lymph, received a tiny amount in the eye as the tube broke. He immediately washed out the eye, and attached no importance to the incident. In the evening the eye became slightly red, and he washed it out still more thoroughly and instilled argyrol. Three days later an intense conjunctival reaction was present, and from that time onwards, in spite of skilled treatment, the eye went from bad to worse. The cornea became infiltrated; iritis, then iridocyclitis, complicated by corneal ulceration, followed. After two months of suffering the eye was enucleated for a glaucomatous condition, which was intensely painful. Sympathetic ophthalmitis was also feared. The moral is, says the authors—(1) to use every precaution to avoid such an accident, (2) to practise such abundant lavage as to make sure every particle of lymph has been removed. [In such a case, if possible, the patient ought not to be content with washing out his own eye, but, after doing it as well as possible, he should seek help and get it done thoroughly and, the reviewer suggests, with an antiseptic solution. On one occasion, pus from a dangerous case spurted into the reviewer's eye. Lavage with 1–2000 perchloride lotion, which was, however, very painful, averted all evil consequences.—A. E. J. L.]

Vivocoll—a Trustworthy Hæmostatic.—O. Thies[3] thus describes '**Vivocoll**', a product made by Pearson, of Hamburg. He thinks it is infallible, and quotes a case of enucleation for glaucoma with a late, formidable, and alarming hæmorrhage. A first injection of two ampoules at the four angles of the muscular cone immediately stopped the hæmorrhage. Following vomiting next day, it recurred. The situation became critical. Injection of 10 c.c., very deeply, caused immediate cessation of the hæmorrhage.

Bleeding by Venesection as a Cure for Recurrent Hæmorrhage into the Vitreous.—A case of a woman who suffered regularly every month from hæmorrhage into the vitreous is reported by C. Hamburger.[4] Menstruation had ceased at 38 years of age as the result of a great sorrow. Four hundred cubic centimetres of blood were removed. The hæmorrhages into the vitreous ceased. It was repeated six times as a prophylactic measure. The hæmorrhages had not recurred for a year and a half.

Loss of Sight following a Severe Hæmorrhage.—F. Terrien[5] reports a case in which a young man, age 22, lost his sight eleven days after severe melæna. His sight started to be affected on the eighth day after the melæna. The author cites another case and gives interesting details about this condition. It appears to follow most often hæmorrhages from the alimentary canal, almost always from the stomach or duodenum. Statistics show that from 30 to 40 per cent of cases are due to this cause, the next most frequent being post-partum hæmorrhage, 30 to 35 per cent. It rarely follows operations, or accidental or war injuries, in which hæmorrhages occur. The condition seems to be due to a failure of nutrition of the retina, leading to atrophy. It usually comes on about six to eight days after the hæmorrhage. The later the appearance, the more unfavourable the prognosis as regards recovery. Blindness results in about 59 per cent of cases, improvement takes place in 28 per cent, and recovery in 13 per cent. The treatment is that of the general condition, combined with keeping the patient in the horizontal position, raising the legs a little above the horizontal. **Pilocarpine** is also given to lower the tension and help the retinal circulation. Operative measures do not appear to be of any value.

Spasm of Accommodation in Elderly People.—G. Leplat[6] reports cases in which a spasm of the ciliary muscle had corrected a marked hypermetropia in two patients of 52 and 53 years of age respectively. He mentions two others in patients 25 and 37 years old. A sudden lowering of the general strength due to various reasons caused the ciliary muscle to relax and produced marked alteration in the sight. He also cited a case of myopia due to ciliary spasm in a man of 67 years of age. It disappeared one year and reappeared the next. The author says that cases like these explain sudden loss of vision in certain cases. [Spasm of the ciliary muscle in people over 50 years old is rare in the reviewer's experience, and it is well to be reminded of its possible existence.—A. E. J. L.]

Causation of Inequality of the Pupils.—E. Velter and A. Tournay[7] go carefully into this question, which is of wide interest. It is obviously a difficult one, and the authors say that more information is required as to the possible automatism of the iris to enable more accurate deductions to be drawn from inequality of the pupils. Three chief causes, however, stand out clearly: (1) Some interference with the conducting paths; (2) Unilateral reflex action or a unilateral predominance, produced by an optimum stimulus; (3) Some distal cause, such as pleuropneumonia, epilepsy, or psychoneurotic affections. [The fact remains that in some cases it is quite impossible to explain inequality of the pupils: but that it is not in all cases followed by other developments may be some consolation to those who have sought the cause in vain. The reviewer has had a similar experience.—A. E. J. L.]

Hypertension of the Retinal Arteries due to Emotion.—M. J. Dubar[8] found that emotion, caused by firing off a revolver behind a patient, caused a rise of tension. It rose rapidly and then fell gradually to normal in about half an hour. A like rise of tension was noted in emotion caused by simpler methods, such as a sharp cry or the fall of an object near. P. Bailliart, in the discussion, said that these facts prove the necessity, before taking a patient's intra-ocular tension, of assuring him that the proceeding is absolutely painless. [Bailliart's warning is a practical point worth noting. In a nervous patient, where the tonometric reading is important as a determining factor in coming to a diagnosis, it points to the need (1) for seeing that the proceeding is really free from discomfort, by attention to details of perfect anæsthesia of the cornea; (2) for a second measurement on another day, when no dread of the proceeding will be felt if the first one was painless. The reviewer uses two instillations of 1 per cent **Holocaine** at five minutes' interval, and waits roughly five minutes after the second one before applying the tonometer. One instillation is not sufficient, in his experience, for a perfect result.—A. E. J. L.]

Senile Changes in Refraction. E. Jackson,[9] in an editorial annotation, quotes the case of a patient in middle life who was given glasses, and told they would not need to be changed. He suffered from eyestrain, and, his former oculist having died, he consulted another. He was found to have developed marked changes in the astigmatism found previously, and to have developed astigmatism in an eye in which it did not, apparently, previously exist. The case is merely cited to serve as an introduction to a valuable note on the changes that take place in refraction with age. Everyone with any knowledge of eye-work at all knows that changes take place during the period of growth and again at the presbyopic period, but many do not realize that, as Jackson says, in middle life from forty years onwards, *changes in astigmatism are the rule rather than the exception.* Elderly people often develop myopia. Suppose, for instance, they were fully corrected for presbyopia at 60 years of age and they develop myopia to the extent of two diopters. This means they are much over-corrected for near work, with the necessity of having to use unnecessary convergence. The giving of a weaker plus lens for reading affords great relief in such a case. The reviewer recently had a case in a medical man who was under the delusion that his glasses would not need changing after 60 years of age. This, it is true, is the case with some people. Practitioners, therefore, would be wise to bear in mind the fact that the refraction changes, and in people who use their eyes a great deal, to insist on their refraction being gone into at more frequent intervals than was formerly thought necessary, if they have any symptoms of eyestrain.

Direct Ophthalmoscopy in High Myopia.—The examination of the fundus oculi is an important matter, not only for the ophthalmologist, but also for the general physician, who has been quick to adopt the electric ophthalmoscope.

As A. Garrow[10] says, the examination of the fundus in high myopia by direct ophthalmoscopy presents considerable difficulty, and one has often to be satisfied with the indirect method. This has obvious disadvantages when one wants to study minute details. The author finds that, by the simple means of making the patient wear his correcting glasses, this difficulty can be avoided. The details of the choroidal and other changes can be accurately studied and the progress appreciated from time to time. There are certain difficulties in the method which can be minimized with practice. The greatest is the bright image of light formed on the patient's glass. If this is in the way, it is best got rid of by a slight upward tilt of the patient's glasses. When an electric ophthalmoscope is being used, this is easily done by holding the glass between the index finger and the thumb of the unoccupied hand and slowly tilting the glass until the light image has been displaced from the pupillary area. When the peripheral portions of the field are being examined it is helpful to tilt the glass slightly towards the part examined.. [This is a really useful and practical device which the reviewer has used constantly since it was kindly brought to his notice by the author. By this method and the use of the electric ophthalmoscope recently designed by Sir William Lister (the Lister-Morton), in his experience it is often possible to examine a fundus with as much as 23 diopters of myopia with almost the same ease as an ordinary fundus. Some details have therefore been given of the method, which the author, however, does not claim as original, but which, as he rightly says, is not found in the usual text-books. --A. E. J. L.]

Essential Progressive Atrophy of the Iris.—J. H. Waite[11] reports a case of this affection. It is a rare condition, but a good many cases have been described. De Schweinitz quotes twelve cases and adds four more, and other cases have been reported. According to de Schweinitz the order of appearance of the clinical signs of the condition is as shown on *Plate XXIV*. The pathology of the condition is very obscure.

The Standard of Vision Required for Aviation.—Flying has come to stay, and the chief points about the medical aspects of it are of general interest. Air Vice-Marshal D. Munro[12] recently stated that at the end of the war 178 survivors applied for permanent commissions in the Royal Air Force. Of these, 177 had high visual acuity and perfect binocular vision. In other words, the men with lower standards of visual efficiency had dropped out.

[There is little doubt that, had medical men known as much about the visual requirements for aviation in 1914 as they do now, many lives would have been saved. Youths are now turning towards aviation as a career, and medical men will be asked by parents if their child will pass for the Air Force. They should state that only an expert can tell this, as not only is very high visual acuity required, but also a perfect muscular balance. If the child has any squint or poor vision in one eye the question can at once be answered in the negative, but the other tests should be carried out by experts.—A. E. J. L.]

Ocular Fatigue in Aviators.[13]—On account of the wide general interest in long-distance flights, it will be of interest to many to know that one of the factors in the causation of accidents is ocular fatigue, particularly that of convergence and accommodation. Fatigue of convergence makes a pilot unable to judge distances exactly and leads to crashes when landing. Experiments have been made to study the fatigue of convergence of aviators, by reducing the oxygen tension of the air they breathe in a Pierce low-pressure chamber so as to reproduce the conditions met with in flying at high altitudes. A method, making use of an ergograph with an attachment of rotatory prisms, has been devised to give a graphic record of fatigue of convergence experimentally.

PLATE XXIV

ESSENTIAL PROGRESSIVE ATROPHY OF IRIS

(J. H. WAITE)

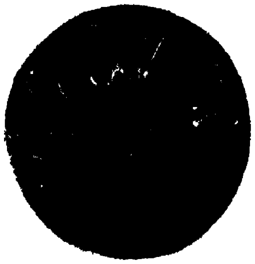

Fig. A.—First stage: the intact pupil becomes eccentric and distorted.

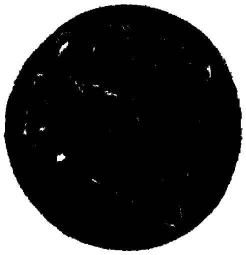

Fig. B.—Second stage: the stretched half of the iris progressively atrophies.

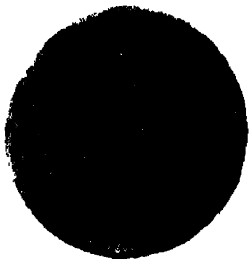

Fig. C.—Third [illegible]

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MEDICAL ANNUAL, 1920

Personal Experience of Chronic Diphtheroid Infection of the Eyelid.—A. F. Cole,[14] a medical man, relates his own very instructive case. He had repeated attacks of inflammation of the left upper eyelid, pus being expressible from the margin. He details the treatment. All the usual collyria ointments and an autogenous vaccine were tried. Teeth were X-rayed and refraction was gone into. He then was advised to go to Switzerland, and there had three attacks in fifteen days. He decided to try treatment for his seborrhœic scalp, thinking this might be a source of infection. He washed it with 15 per cent sphagnol soap, and applied a lotion to the eyelid every night made up as follows: -

℞	Acid. Salicyl.	gr. xxx	Ol. Ricini	ʒii
	Sp. Rosmarini	ʒj ;	Sp. Vin. Rect.	ad ℥j

This cured the condition. It should be mentioned that cultures on three occasions showed diphtheroid bacilli only, no staphylococci being present. [One swallow does not make a summer, nor does one case prove anything. This medical man, however, had had the advice of many skilled men with no beneficial effect. The remedy is so simple that it is worth bearing in mind. —A. E. J. L.]

Miner's Nystagmus.—In an annotation in the *British Journal of Ophthalmology*, 1927, p. 522, a useful summary of the present position of this important subject appears. Freeland Fergus rejects the findings of the Nystagmus Committee respecting the defective light theory, or at least regards them as not proven. He points out that the introduction of electric light has not always been followed by an improvement in nystagmus statistics, and even in some cases nystagmus seems to have increased. Professor Haldane and Lister Llewellyn, who are largely responsible for the work of the Committee, point out that the evidence that the essential cause of the disease is defective lighting is quite overwhelming. They say those who do not agree with this are misled by the idea that the electric hand lamps at present in use give a good illumination. Actually this illumination is extremely defective, and not much better than that of the older form of oil safety-lamps. Where conditions render really efficient lighting possible, as in America, nystagmus is unknown. The writer quotes the conclusion he arrived at in a former annotation: "Thus there would seem to be a disease, miner's nystagmus, the nature of which we, as ophthalmic surgeons, can appreciate, accurately measure, and record; there is another disease, miner's psychoneurosis, of which we, as ophthalmic surgeons, have no special knowledge." We do not see that the present correspondence tends to alter this view. [For correspondence, see *Brit. Med. Jour.*, 1927, June 18 and July 2. —A. E. J. L.]

Blepharochalasis.—Accardi[15] describes a case and gives a review of the state of knowledge of this somewhat rare condition. For an account of the disease and for illustrations see MEDICAL ANNUAL, 1928, p. 156. The author attributes the condition to some endocrine disturbance, but is unable to specify the gland at fault. [The case is quoted chiefly to call attention to the wide distribution of this peculiar condition first described by Fuchs. It is said to be often treated by physicians who do not recognize the disease and merely treat the eyelids.— A. E. J. L.]

Cure of a Case of Intermittent Exophthalmos due to Orbital Varices.—R. E. de Brescia[16] treated this case by injecting the **Sclerosing Fluid of Genevier** (chlorhydrate of quinine 4 grm., urethane 2 grm., distilled water 30 grm.). After some rather sharp reactions the exophthalmos disappeared, and did not appear again after either exertion or compression of the jugular veins.

Are the Usual Ointments put up in Tubes for Ophthalmic Work Sterile?— J. Chaillous and D'Autreuaux[17] planted out various ointments, usually sold in tubes, on various media. They were of a wide range—e.g., optochine, cadmium, xeroform, yellow oxide, etc. All the culture media remained sterile. A. von Morax, however, in the discussion, pointed out that these results must be accepted with reserve when it came to the use of the ointments clinically. Micro-organisms, enveloped by vaseline, might retain their vitality, and though prevented by the surrounding antiseptic from growing in a culture medium, might grow if injected under the skin or in contact with a mucous membrane.

Zinc Ionization in Ophthalmic Work.—E. Temple Smith[18] was led to use this method of treatment by an experience which he relates. A fulminating case of pneumococcal ulcer in a boy, seen early, was treated by carbolic acid and the actual cautery. Later a paracentesis and, finally, a Guthrie's corneal section were done. The eye was saved, but nearly all the cornea became opaque. A week later he saw a similar case. This case was treated by **Zinc Ionization** without using the actual cautery. The next day the floor of the ulcer was silvery and free from pus and it healed without spreading further. Since then the author has used the method for several years with so much success that he is now never without the means of using it. Its most striking success is in corneal lesions, but it is of value in infected or suspicious wounds of the limbus. He has also found it useful in blepharitis, especially in the dry type, and in certain cases of trachoma.

He uses a battery of two or three dry cells in a box with a very finely wound rheostat. Interposed in the circuit is a milliammeter. This should be in such a position that it can be easily read by the operator. The zinc electrode is a short length of chemically pure zinc wire which can be supplied by any firm of electricians. The wire is mounted in a holder such as is used for electrolysis. It is attached to the positive pole, since zinc is a kation, having a strong affinity for the negative pole. To the negative pole is attached the indifferent electrode, a plate of metal, lead, or pewter, with about twenty folds of towel moistened with saline solution between it and the skin. In treating the cornea it is most important that *not more than half a milliampere be used*, and that only for two or three seconds, otherwise severe neuralgia is caused. This can be relieved by hot fomentations and a sedative powder. Unless a cauterizing effect is desired, which in a definitely septic and deep ulcer may be necessary, as a matter of routine the author twists round the zinc wire a very thin layer of absorbent cotton, and dips this at intervals into a 1 per cent solution of zinc sulphate. The ulcer should first be cleansed of débris by using the covered electrode as a swab, and the surface is then treated with a freshly mounted wire. The conjunctival sac should always be washed out with saline solution after treatment, as with the tears zinc chloride will be produced, which is irritating. [Sufficient details of this apparently useful method of treatment have been given to allow those not satisfied with their present methods of treatment to give it a trial.—A. E. J. L.]

Ultra-violet Light in the Treatment of Eye Diseases.—W. S. Duke-Elder[19] has written two long articles on the use of ultra-violet light (1) generally, (2) locally. The articles give detailed information as to dosage, dangers, and cases treated. Special apparatus is described and illustrated for local phototherapy, most of it designed by the author. Little that is newer than the account given in the MEDICAL ANNUAL for 1928, p. 154, part of which was specially written by Mr. Duke-Elder, is, however, to be found. There seems no doubt that in experienced hands good results are to be obtained from this method of treatment. It is particularly necessary to safeguard the lens in local treatment, and the method is at present only fit for use by experts.

Radiotherapy in Tuberculous Iridocyclitis.—A. Richter[20] treated forty cases of this condition with radiotherapy: twenty-nine, or 72 per cent, were cured,

PLATE XXV

LIGATION OF ANGULAR VEIN

(C. A. ROEDER)

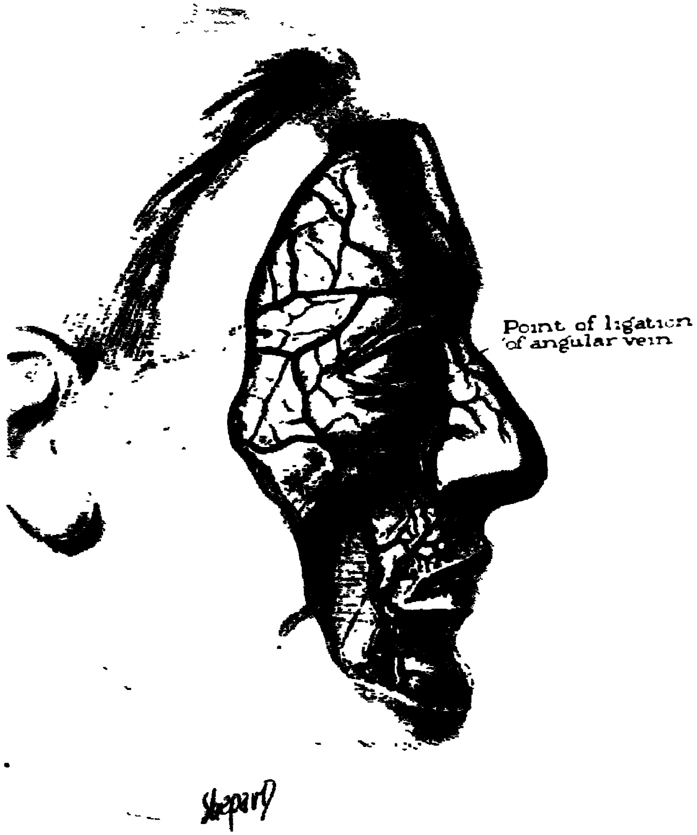

Fig. A.—Superficial veins of face. Note small veins branching off facial vein, passing beneath anterior border of masseter muscle. The point of ligation is above the branch from the side of the nose.

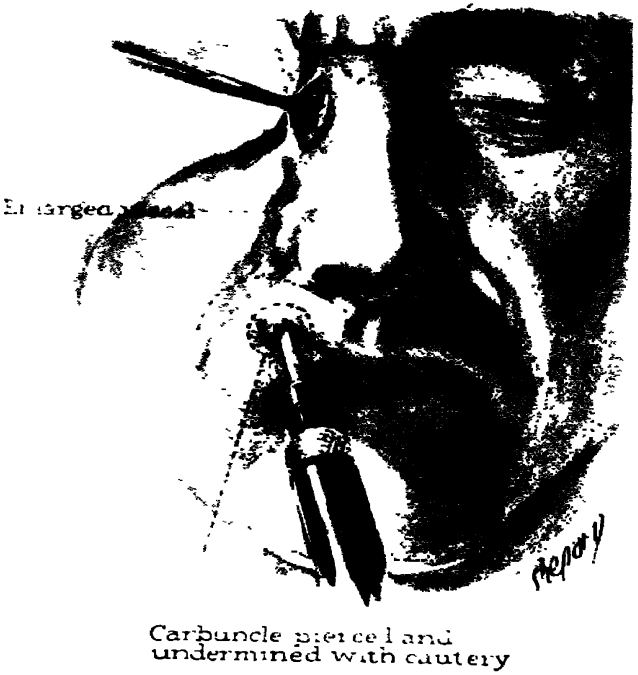

Fig. B.—Outside dotted line represents excursion of cautery beneath the skin. The vein has been divided between ligatures.

By kind permission of the 'Journal of the American Medical Association' whilst four cases were improved. Recent cases give the best results, nine out of ten being cured.

Deep Radiotherapy in Pituitary Tumours.—H. Villard[21] says truly that all operators recognize the great difficulties and danger to life of operation in these cases. His experience is that **Deep Radiotherapy** always improves and sometimes cures the condition. The cases of the latter are sufficiently numerous to enable one to speak of permanent results. He considers deep rad otherapy the best and least dangerous method of treatment. [Villard is, of course, an ophthalmologist, but these patients usually consult an ophthalmologist first if it is the state of the vision that usually is the factor determining whether operation should be done or no. The practitioner is certain to be asked his opinion as to various methods of treatment. The opinion of the reviewer is that all methods are very unsatisfactory. It would seem wise to try radiotherapy first, and if this remedy fails, surgical interference can be resorted to. —A. E. J. L.]

REFERENCES. [1]*Proc. Roy. Soc. Med.* (Ophth. Sect.), 1928, 55. [2]*La Clin. Ophtal.* 1927, 590; [3]*Klin. Monatsbl. f. Augenheilk.* 1927, April, 549; [4]*Ibid.* (abstr. *La Clin. Ophtal.* 1927, Aug., 471); [5]*La Clin. Ophtal.* 1927, July, 400; [6]*Bull. de la Soc. Belge d'Ophtal.* 1927, No. 5; [7]*Ann. d'Oculist.* 1928, 64; [8]*Proc. Soc. d'Ophtal. de Paris*, 1927, March; [9]*Amer. Jour. Ophthalmol.* 1928, Jan., 62; [10]*Brit. Jour. Ophthalmol.* 1927, July, 343; [11]*Amer. Jour. Ophthalmol.* 1928, March, 187; [12]*Brit. Med. Jour.* 1928, August, 205; [13]*Amer. Jour. Ophthalmol.* 1928, 361; [14]*Ibid.* 1927, 413; [15]*Boll. d'Oculist.* 1925, 369 (abstr. *Ann. d'Oculist.* 1928, 224); [16]*Boll. d'Oculist.* 1925, 174 (abstr. *Ann. d'Oculist.* 1928, 220); [17]*Proc. Soc. d'Ophtal. de Paris*, 1927, June; [18]*Med. Jour. Australia*, 1927, July 23, 115; [19]*Brit. Jour. Ophthalmol.* 1928, June, 291, and July, 353. [20]*Klin. Monatsbl. f. Augenheilk.* 1927, Jan. · [21]*Rev. gén. d'Ophtal.* 1927, 467.

FACE, INFECTIONS OF. (*See also* STAPHYLOCOCCAL INFECTION.)

Sir W. I. de C. Wheeler, F.R.C.S.I.

Sepsis about the Lips.—The reviewer[1] has drawn attention to the high mortality following sepsis about the lips. The reason why boils or carbuncles in the region of the lips are formidable lesions is largely an anatomical one. These and other infections of the face may prove serious on account of the anastomosis of the superior ophthalmic vein with the facial at its origin at the root of the nose. Thrombophlebitis reaches the cavernous sinus through this channel.

C. A. Roeder[2] draws attention to the frequent fatality of septic cavernous sinusitis and meningitis. Roeder has had 5 cases of deep infections of the upper lip in the last ten years. Four patients died. He recommends **Ligation of the Angular Vein** (*Plate XXV*) on the same principle that the internal jugular vein can be ligated for septic lateral sinus thrombosis. In describing one of the five cases, Roeder states: It appeared that in the previous two hours the left angular vein had greatly increased in diameter. An incision about half an inch in diameter was made over the left angular vein, starting downward from the level of the inner canthus. The vein was definitely distended, probably because of a thrombosis below. It was tied between catgut ligatures and cut between. A culture from the lumen proved negative. The carbuncle was then burned out thoroughly with a small point electric cautery. During this procedure it was found that there was a purulent thick exudate undermining the lip to the midline and extending outward about three-quarters of an inch beyond the crater of the carbuncle. The entire cavity was thoroughly cauterized, leaving a clean granulating wound forty-eight hours later. Recovery was very satisfactory.

Hamilton Bailey[3] gives a diagram of the cavernous sinus and its connections (*Fig.* 10). He states that ligation of the angular vein under local anæsthesia is a measure which is entirely free from danger. If necessary, ligature may be done on both angular veins. A sign which foretells impending danger is spreading œdema from the lip to the inner canthus. If, in addition, there is considerable elevation of temperature, the call for action is imperative. After novocain has been infiltrated, an incision is made commencing a little below the inner canthus and passing downwards and very slightly outward for about one inch. There is always much troublesome oozing, which can be quelled by packing with gauze soaked in adrenalin. Dissection in the wound will reveal the fibres of the levator labii superioris alæque nasi. The angular vein will be found in or beneath this muscle. It is divided between ligatures. Bailey believes that a general anæsthetic is absolutely contra-indicated in these cases. He injects the patient's own blood into the tissues around the carbuncle and applies hot moist dressings. This procedure, combined with general treatment, has given satisfactory results in carbuncles in all situations.

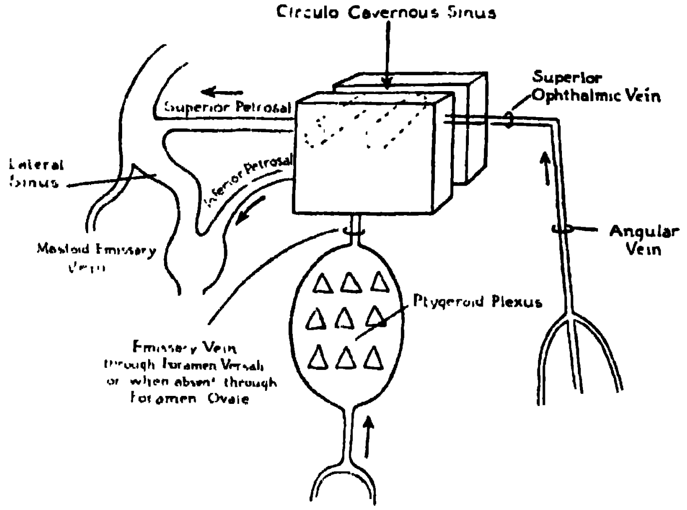

Fig. 10.—Diagrammatic representation of the cavernous sinus and its connections.
(*By kind permission of the* '*Clinical Journal*'.)

REFERENCES.—[1]*Irish Jour. Med. Sci.* 1926, Aug., 369; [2]*Jour. Amer. Med. Assoc.* 1928, i, 272; [3]*Surg. Gynecol. and Obst.* 1928, April, 565.

FACIAL PARALYSIS. (*See* NERVES, PERIPHERAL.)

FILARIASIS.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

The development of *Filaria perstans* in *Culicoides austeni* is dealt with by N. A. Dyce Sharp.[1] The embryo worm is very widely distributed throughout west and central tropical Africa, where from 10 to 75 per cent of the population are infected, and it is generally regarded as harmless, although some dispute this. Europeans are rarely attacked by the parasite, and this led light-avoiding insects to be suspected as the carrier, such as *Culicoides*. On experimenting with these minute flies, development of *F. perstans* in them was discovered in the thorax, and the developed worms were traced to the head and the proboscis of the fly in large numbers by the end of the eighth day of development in the insect. Wild flies were then caught and dissected, and from 6 to 16 per cent were found to harbour filaria, with an average of 7 per cent, while 92 per cent of the natives in British Cameroon were infected with *Filaria perstans*. Transmission to man has not yet been witnessed owing to the microscopical proportions of the mature larvæ. The same worker[2] deals with filariasis in the Cameroon, where he found 6 per cent of the people infected with *Loa loa*, 2 per cent with *Filaria bancrofti*, and 92 per cent with *F. perstans*, while the skin of from 53 to 97 per cent showed the *Onchocera volvulus*. In the Zanzibar Protectorate, W. Mansfield-Aders[3] has found *M. bancrofti* in the night blood of 26·3 per cent of the people examined, and 20·3 per cent of *Culex fatigans* showed the developed microfilaria in their proboscces. V. T. Korke[4] in the Bihar and Orissa province of India has found microfilaria in the blood of 25 per cent of those suspected to be infected on clinical grounds, and in 10 per cent of the apparently healthy.

REFERENCES.—[1]*Trans. Roy. Soc. Trop. Med. and Hyg.* 1928, Feb. 25, 413; [2]*Ibid.* 371; [3]*Ibid.* 1927, Nov. 25, 207; [4]*Ind. Jour. Med. Research*, 1928, July, 187.

FISTULA IN ANO.

J. P. Lockhart-Mummery, F.R.C.S.

There is probably no form of rectal disease which gives so much trouble, or which is so often badly treated, as fistula in ano. The number of cases applying for treatment at St. Mark's Hospital, or referred to the specialist, which have previously had one or several operations, is more than half the total of such cases, and is very strong evidence of the poor results usually obtained. The truth is that the condition is particularly difficult to cure, and that the principles underlying successful operation are not very well understood. Hardly two cases of fistulæ are the same, and there is no one single method of treatment which can be applied. There still seems to be a belief that complete division of the external sphincter is necessary, and this often leads to serious impairment of the patient's bowel control. Loss of control over the sphincter should *never* occur after a fistula operation if properly performed. The sphincter should not be divided unless this is quite unavoidable in order to lay open the track of the sinus, and then should not be done at the first operation, but postponed to a second operation when the healing of the main wound is well advanced.

The main principle of operating for fistula is to obtain free drainage to the outside of all tracks and sinuses. It is, however, not sufficient that this drainage should be adequate just after the operation; it must remain adequate throughout the period of healing. There is always a tendency for the superficial parts to heal more quickly than the deep parts, and this is liable to cause inadequate drainage, with the result that the healing process which was progressing favourably ceases and further healing cannot be obtained. It is, of course, not always possible to lay open a very large and deep fistula in such a way that adequate drainage will be maintained throughout the healing process, but in such a case the operation should be divided into two stages.

The ideal to be aimed at in operating for fistula is to leave a large open wound and not a deep narrow one. The skin should be cut away at the sides and all islands of skin removed, so that the widest part of the wound is at the skin surface. The wound must be laid open into the bowel in most cases, but it is only in a minority of fistulæ that this will involve division of the sphincter muscle. As already stated, if complete division of the external sphincter is necessary, it should be done at a second operation and not at the first.

It is essential that all tracks be laid open, as if one is missed the operation will almost certainly be a failure. The tracks can be followed by feeling for indurated areas between the finger and thumb, and by seeing the granulations under a good light after scraping away the lining of the main track.

When operating for fistula, the following points should be observed: Pass a grooved director into one of the external openings and lay this track open by cutting on to the groove, but do not lay it open into the bowel if there is any doubt of the sphincter being involved. Any side tracks that are obvious should then be laid open into the main one and the granulation tissue scraped away. With the wound well retracted and in a good light the openings of other tracks should be looked for, and if found divided to their extremity. A very careful search may be necessary, but a probe should never be used other than gently, or artificial tracks may be made. Real tracks are easily seen, as they are lined with dark-coloured granulations. When all the tracks have been divided the connection to the rectum should be examined and, if the sphincter is not involved, laid well open; otherwise it should be left. When the fistula has resulted from a double ischiorectal abscess, there will almost invariably be a posterior opening into the bowel, and a deep cross-track just behind the anal wall; this track is frequently missed. All the tracks having been divided, cuts are made with the scalpel into any dense fibrous tissue, with the object of allowing the granulations to come through and hasten healing. The skin edges are next freely cut away and any intermediate islands between tracks removed. The wound is then washed out and packed very lightly with cotton-wool. This wool is left in for three to four days and then washed out, and after this the wound is lightly packed twice daily after an antiseptic bath.

In a fortnight or three weeks the second operation is performed, if necessary, and the sphincter, if divided then, will not retract and there should be no danger of loss of control. At the same time any tracks that are not draining well can be opened up again. The patient should stay in bed, except for baths, until everything is quite healed up. Antiseptics should not be used after the first week, but in the later stages oily dressings are an advantage, as they preserve the granulating walls. A very good dressing at this stage is: Scarlet-red ointment, gr. 20; Ol. ricini, gr. 40. This should be used very sparingly, as otherwise, being an aniline dye, it will cause a mess.

The most recent method of treating fistula, which the author now uses whenever possible, is to dissect out completely all the fistulous tracks, leaving the wound wide open and without any packing for a week. Healing takes place by granulation in the usual way, but is much more rapid, and many weeks can be saved. This method requires great care in dissecting out the tracks, and careful antiseptic methods to prevent extension of the septic process. It is not to be recommended except to those who have had considerable experience of fistula operation, as a very extensive dissection is sometimes necessary and no portion of the track must be left behind.

The following suggestions in treating fistula in ano may be found useful: (1) Never operate for a fistula when there is an acute abscess; be content with drainage of the abscess. (2) Do not completely divide the external sphincter when operating for fistula. If it is necessary, wait until the other tracks have healed as far as they will and then divide it. (3) Look carefully for all tracks and do not leave any undivided, with the possible exception of that leading into the rectum (there is never more than one). (4) Provide very free drainage by cutting away tissue when necessary. (5) All packing should be as light as possible and should consist of cotton-wool rather than gauze. (6) Keep the patient in bed till all the wound is healed.

FOOD FROM THE PUBLIC HEALTH POINT OF VIEW. (*See* DIET.)

FRACTIONAL TEST-MEALS IN CHILDREN.

Reginald Miller, M.D., F.R.C.P.

W. S. C. Copeman and N. Gray Hill[1] have endeavoured to investigate this almost unexplored field, using fifty children in apparently good health, under good conditions, and free from dyspeptic symptoms. The object of their research was to compare the information derived from the fractional test-meal in children with the accepted results in adults; they had also a further end in view, namely, to study the gastric digestion of rheumatic children in particular. Early in their investigations the authors found themselves questioning the reliability of the usual methods, and doubting the truth of the interpretations usually put upon such readings; they ultimately concluded that the estimation of 'total chloride' is of more value than those of 'free HCl' and 'total acidity', which they found to vary very much even in the same individual at short intervals. Thus the comparatively minor differences from those of adults which they found in their results they do not seem to desire to emphasize until the methods of investigation are (in their opinion) less open to question.

REFERENCE. [1] *Quart. Jour. Med.* 1928, xxii, 33.

FRACTURES. (*See also* ATLAS, INJURIES OF; BONE AND JOINT DEFORMITIES, CONGENITAL; PERIARTERIAL SYMPATHECTOMY; SPINE, AFFECTIONS OF: SPINE, FRACTURES OF; VASCULAR SURGERY—X RAYS IN ARTERIAL DISEASE.)

E. W. Hey Groves, M.S., F.R.C.S.

General Considerations.—The treatment of fractures becomes increasingly important every year. On the one hand, traffic accidents are becoming more common, and on the other the standard of results expected in any given case becomes higher, whilst the public and the Law Courts are more than ever familiar with X-ray appearances. The reviewer[1] has collected 100 consecutive cases of fractures which have 'gone wrong', in the sense that after a long interval of time each case had to be sent to a Hospital Consulting Surgeon for a revision of the primary treatment. The rough classification of the hundred cases is as follows: Humerus (excluding lower end), 7; elbow, 15; radius and ulna (shafts), 17; Colles, 7; femur (neck), 9; femur (shaft), 12; tibia and fibula (shafts), 22; ankle, 11.

Fractures of the *humerus* likely to give trouble are those of the upper end of the shaft, and of the lower end. Fractures round the shoulder-joint are very liable to cause stiffness of the joint, with atrophy of the deltoid. The line of safety in all these cases is to put the arm up in full abduction from an early date. Fractures of the lower end of the humerus, particularly in children, are exceedingly likely to give rise to anxiety. The typical supracondylar fracture, with backward displacement of the lower fragment, is by no means easy to reduce into perfect position. Early manipulation within a few hours of the accident, full anæsthesia, traction on the arm followed by flexion of the elbow-joint, and a fixation of the hand by a wrist sling in moderate flexion, is the routine method to be employed. It is wise, whenever possible, to carry out the whole manipulation under the fluorescent screen. It is of the utmost importance to make sure that the circulation in the arm is not impeded by forced flexion, otherwise there is a grave danger of ischæmic contracture. If the case is seen twenty-four hours or more after the occurrence of the accident, it may be impossible to obtain accurate reduction. In such a case it is wiser to reduce through an open incision rather than to be content with an inaccurate fitting of the bone.

Fractures of the *forearm bones* which give bad results are usually those in which the lower end of the radius becomes displaced towards the ulna, with the result that rotation of the hand is lost, the member usually being held in fixed pronation. If the X rays show such a displacement of the lower radial fragment, it is better to submit the case to open operation than to trust to luck.

Fractures of the *wrist* and *ankle*, most of which are more or less typical examples of Colles' fracture or Pott's fracture, frequently give rise to loss of function or to litigation. The cardinal point of safety in the treatment of both these injuries is the same, namely complete reduction of the deformity.

Fractures of the *neck of the femur* will always continue to be a subject of difficulty. The bad results in these cases are due in the first place to the diagnosis being overlooked, and in the second to inefficient treatment. It is probably not an overstatement to say that every true intracapsular fracture of the neck of the femur will never unite naturally unless efficient impaction be carried out by either Nature or art. This subject is referred to in greater detail in a later portion of this article.

Fractures of the *shaft of the femur* are much better treated now than they used to be before the War, but there are still a large number of cases with serious mal-union, angulation, and shortening. To avoid such results, by far the best method is to employ in the first place some efficient traction method, and in the second place, after full length and correct alinement have been secured and after union has taken place, to employ a walking caliper splint for three to six months in order to avoid the secondary deformity caused by a bending of the soft bone.

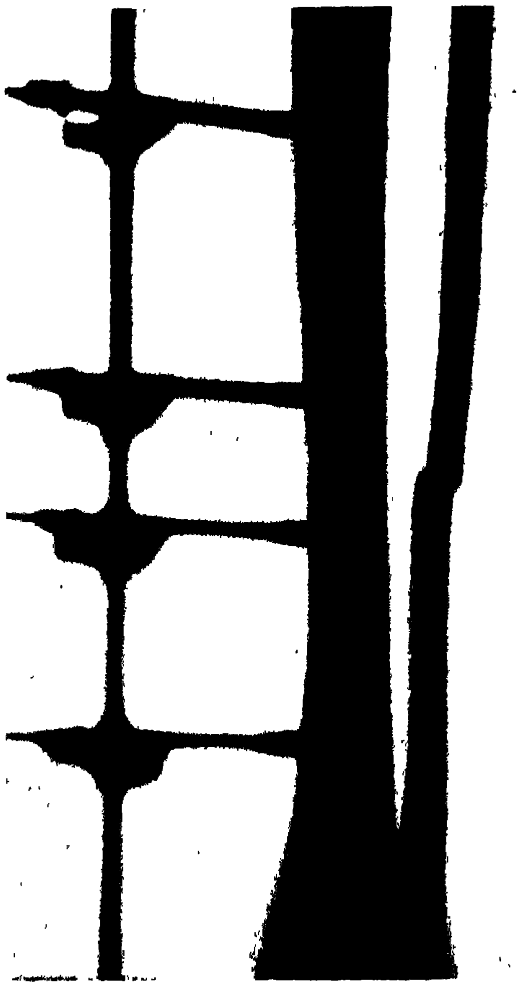

Fig. 11.—Transverse fracture of the tibia with Juvara's *fixateur externe* applied.

Fractures of the *shafts of the tibia and fibula* actually form the largest group in the present series. Two types of bad result are common. In one there is bad mal-union with marked angulation. Such angular deformity is easy to correct in the early days of treatment, and it would never occur in the final result if the limb had not been wrapped up in plaster or splints without proper checking by the X rays. The other troublesome kind of case is that of non-union, and it is probable that this result cannot always be prevented, but will have to be treated by open operation.

Disability and Cost of Industrial Fractures.—It is much to be regretted that we have no regular statistical information as to the average length of time which is occupied in the recovery of the various types of fracture. It is a subject of very great practical importance, both in order to see where treatment should be improved, and also to realize the tremendous cost to the community of these common industrial accidents. R. N. Gray,[8] of San Francisco, has done very great service in compiling and classifying no less than 34,758 cases of fractures from the compensation files of insurance companies. The figures are so large and the classification so complicated that it is only possible here to refer to certain broad conclusions. The more serious fractures of the large bones, such as the femur, humerus, and tibia, give a much quicker recovery when treated by the specialist than by the family doctor. Open or operative treatment compares very unfavourably with closed methods, both in the length of disability and the cost of treatment. The average period of disability in fractures of the femur is no less than 54 weeks, and the average cost to the company nearly 2000 dollars. These are facts which are well worthy of study.

Open Operations for Fractures.—Since the days of the War surgical opinion has tended to be against the frequent use of open operation for the treatment of fractures. This is because experience showed that excellent results could be obtained in most difficult cases by traction methods which involve no risks to life or limb. Probably, however, the pendulum of opinion has swung too far in the opposite direction. In civil cases it should be remembered that there is the very important element of time lost during recovery. If, therefore, any method of treatment offers a reasonable chance of quick and perfect recovery it is worth consideration. Lambotte, who was one of the pioneers of operative osteosynthesis, has familiarized us with the use of an apparatus which combines internal with external fixation of a fracture. He called this a *fixateur externe.* This appliance has, however, never found favour in this country for various reasons. E. Juvara[3] has recently described the good result obtained by a fixateur designed by himself in 1913, which resembles that of Lambotte, with special features of its own. The fracture having been exposed, reduced, and held in good position, four screws are driven into the shaft of the bone, two above and two below the fracture. The shanks of the screws project outwards through the wound in the soft parts and are joined together by a longitudinal metal bar (*Fig.* 11). This is essentially the same principle as Lambotte's apparatus, but it is only used for transverse fractures. In the case of oblique fractures the fixateur is of a simpler pattern, resembling somewhat in principle the device for tightening a Parham's band. That is to say, a metal wire is passed round the fracture and drawn tight and fixed in a projecting tubular screw (*Fig.* 12). The whole apparatus is left projecting from the wound for several weeks, after which it is removed. It has the advantage, therefore,

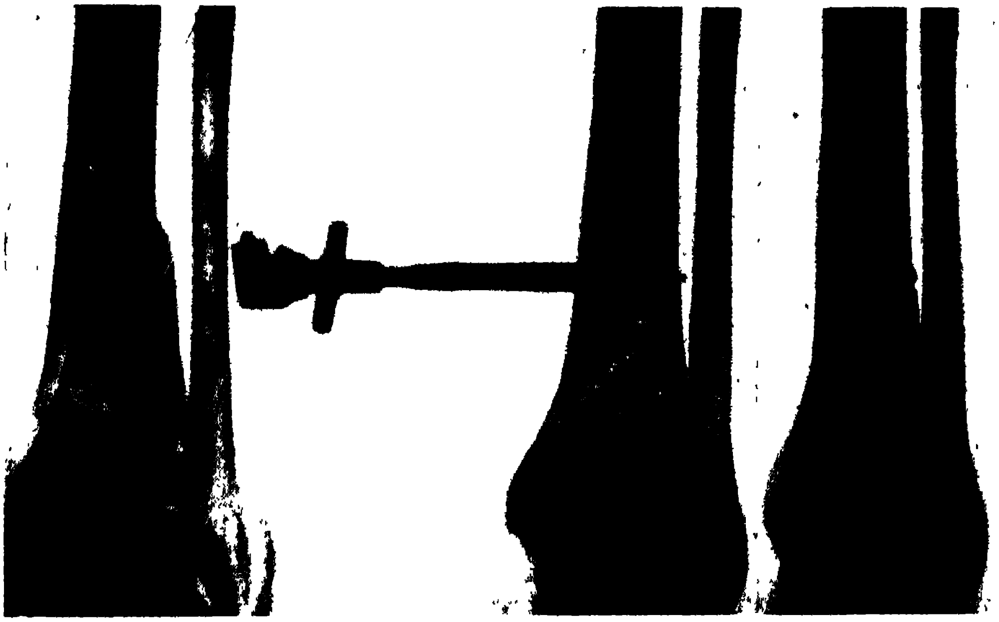
Fig.* 12.**—Oblique fracture of the tibia treated by means of the *ligateur fixateur*. (Figs.* 11, 12** *by kind permission of the 'Bulletins et Mémoires de la Société nationale de Chirurgie'.*)

of accurate and firm fixation of the fracture without leaving a metal band in place permanently.

The Use of Zinc Gelatin Dressing.—We have long been familiar with the use of Unna's paste in the treatment of chronic ulcers of the leg. F. Schnek,[4] of Vienna, working in the large accident hospital of that city, strongly advocates the use of zinc gelatin dressing both in the treatment and after-treatment of fractures. The preparation he advises has the following formula: Zinc oxide, 1 part; gelatin, 2 parts; water, 3 parts; glycerin, 4 parts. In the routine treatment of a fractured femur traction is first made by means of a pin passed through the upper end of the tibia. After a fortnight the whole thigh is covered with the zinc gelatin dressing pasted on to the unshaven limb alternately with layers of gauze bandage. This is allowed to dry for twenty-four hours; the transfixation pin is then removed, and traction applied by means of the zinc gelatin dressing. Another very useful suggestion made by Schnek is that of the use of zinc gelatin dressing in the after-treatment of fractures of the leg for the purpose of preventing œdema and other circulatory disturbances which so often follow long recumbency when the patient first begins to walk. Applied for this purpose the dressing extends from the popliteal space to the base of the toes and is left in position from two to four weeks.

SPECIAL FRACTURES.

Fractures of the Neck of the Femur.—Although the treatment of these fractures both in general and in hospital practice still remains very unsatisfactory, yet amongst special workers matters which were formerly in dispute are now generally accepted. Thus the following facts are now matters of general agreement: the age-incidence in fractures of the true neck of the femur is from adolescence to old age; the causation of the fractures is generally indirect violence of a trivial character; these fractures have no tendency to natural recovery unless impaction is present; the only efficient method of treatment is by forced abduction with internal rotation, the limb being subsequently fixed for several months in a plaster case; this forced impaction of the fracture may be carried out either through an open operation or by closed manipulation.

G. F. Stebbing[5] has given his experience of 341 cases of fracture through the upper end of the femur. He believes that all fractures through the neck of the femur, whether intra- or extracapsular, are due to indirect violence, and that the only fracture which is caused by direct blows on the trochanter is that of the floor of the acetabulum. [We think that the evidence on which this statement is made is quite insufficient. However, this is a point of theory which is of no great practical importance.—E. W. H. G.] Of his cases 111 presented fractures through the true neck of the femur. In the great majority of these Whitman's abduction plaster was applied; in fact, this method was used in all patients except the very old and feeble. X-ray evidence is given that this method frequently produces good results (*Plate XXVI*), but, unfortunately, the author is not able to tell us in what proportion of his cases bony union was effected. Fractures through the great trochanter are frequently found to be impacted, but such impaction should be undone, as it is associated with a bad position of the bone. After disimpacting the fracture, the limb is put up in abduction with weight traction. It is rather surprising to learn from Stebbing's paper of the high mortality which attends these fractures; 111 patients with fractures of the true neck of the femur, 31 deaths; 207 with pertrochanteric fractures, 51 deaths. This high rate of mortality is largely due to many of the patients being aged and destitute and already suffering from other diseases.

It is interesting to compare with Stebbing's figures those of Löfberg,[6] who

PLATE XXVI

FRACTURE OF NECK OF FEMUR

(G. F. STEBBING.)

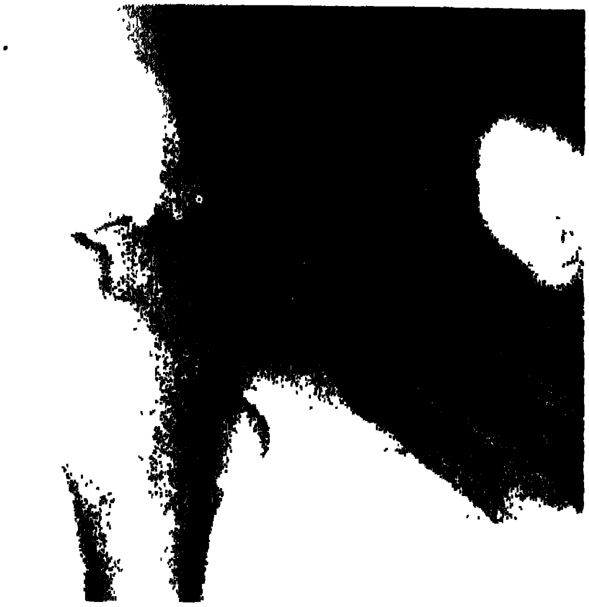

Fig. A. Skiagram of fracture before treatment

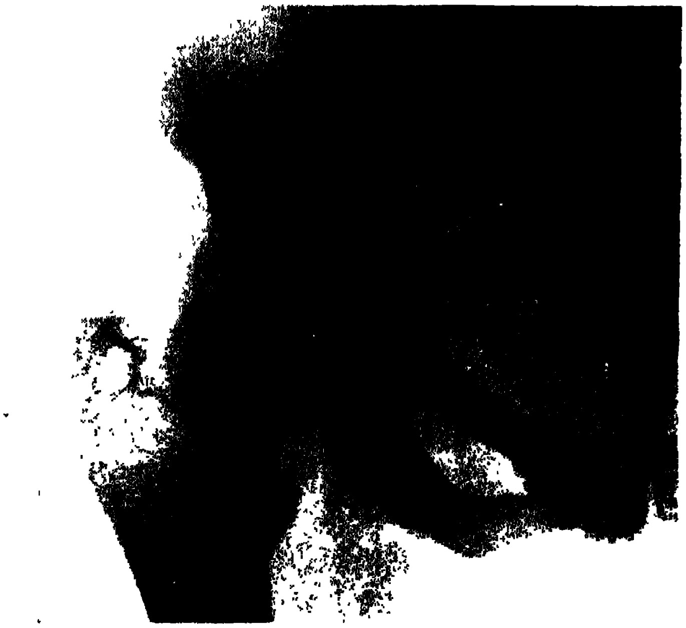

Fig. B.—The same case twelve months after treatment by Whitman's abduction plaster.

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PLATE XXVII

ARTIFICIAL IMPACTION IN HIP FRACTURES

(F. J. COTTON)

Fig. A.

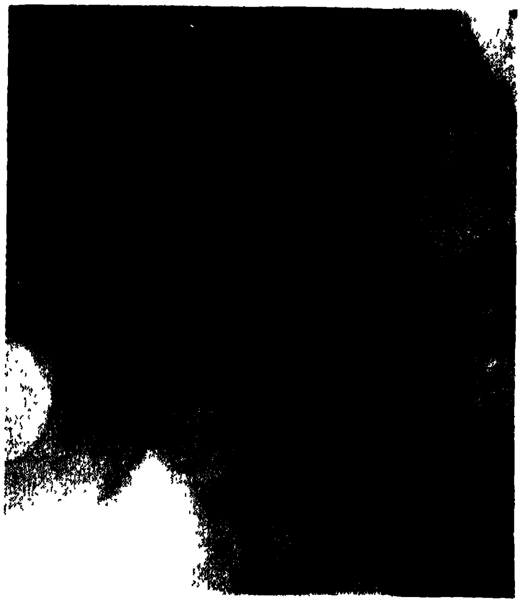

Fig. B.

Fig. A.—Skiagram of fracture before reduction.

Fig. B.—The same case as *Fig. A*, through the plaster, after reduction and artificial impaction with the mallet.

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has recorded 389 cases from the surgical section of the Civic Hospital in Malmö. All these cases, too, whether the fracture was close to the head of the femur or adjacent to the trochanters, were treated by forced abduction with inward rotation, and fixed by plaster-of-Paris. Of these cases 168 had fractures of the true neck of the femur, and of these the treatment gave a good result in 86, fairly good in 28, and a bad result in 39; 10 cases died. Taking all these cases into consideration, the author considers that he is justified in claiming 67 per cent of results showing bony union with good function. Cases of fracture through the trochanters were 92, with 68 good results, 10 fairly good, and 4 bad; 6 patients died. In all these cases bony union occurred. Löfberg concludes that open operation should be reserved for young patients whose general condition is good if non-union with pain and loss of function follows conservative treatment.

F. J. Cotton[7] has for twenty years past advocated a procedure which certainly ought to increase the efficiency of forced abduction. Recognizing that the only cases of intracapsular fracture which undergo natural healing are those which are impacted, Cotton suggested that in addition to manipulation by traction, abduction, and internal rotation, steps should be taken to bring about artificial impaction. The great trochanter is protected by a layer of felt, and then struck by a large wooden mallet weighing five or six pounds by a series of repeated blows until the limb is felt to be locked, the toes standing up like those of a sound leg and no longer rolling outwards when it is let go. This impaction in the abducted position is followed by fixing of the limb in a double plaster spica with a cross-bar at the knee. This latter modification in the plaster case enables it to be cut much lower in the abdomen so that the patient can sit up from an early date (*Plate XXVII; Fig.* 13).

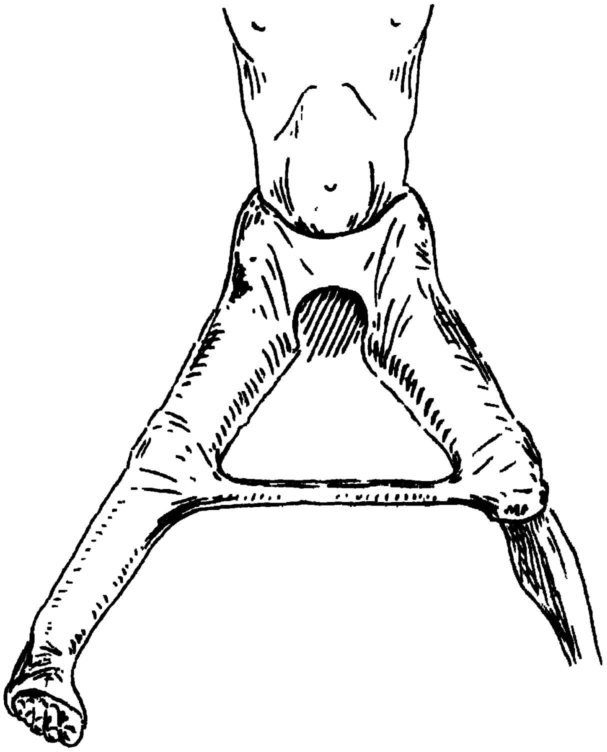

Fig. 13.—The double spica. The important thing is the cross-bar of plaster, 1½ to 2 in. in diameter, solid enough to handle the patient, fracture plaster and all. Abduction of both thighs, internal rotation on the damaged side. Note the amount of freedom given to the abdomen as well as the chest. (*By kind permission of 'Surgery, Gynecology and Obstetrics'*.)

Whatever method of treatment is used for recent fractures of the neck of the femur, all authorities are agreed that, in the late cases of non-union with pseudarthrosis, open operation affords the only prospect of relief. It must be admitted, however, that open operative treatment is not equally demanded by all cases. In some, age and debility make the patient more suitable for an invalid's chair; in others, a fair degree of useful activity may be achieved by means of a walking caliper splint; but in the majority of cases, including all young and middle-aged patients of an active disposition, open operation should be advised. There are two operative procedures for the relief of non-union of the neck. In one the fracture is united by means of a peg, and in the other a reconstruction operation is done, the head of the bone being removed entirely whilst the remaining portion of the neck is forced into the socket, the great trochanter being moved outwards or downwards. F. H. Albee[8] has done very good service in collecting a number of cases of both these types of operations and in tracing the end-results. He has been able to trace the late results in no less than 80 cases. Of these, 36 were treated by the bone-peg method and gained 90 per cent of good results, whilst 44 were treated by the reconstruction method with 75 per cent of good results. There can be no doubt that the deduction from these findings is that it is very much better to set out with the intention of carrying out a pegging operation, and of reserving the reconstruction method for those cases only in which operative exposure shows that there is very little hope for bony union. Frequently this point would seem to be in doubt even after inspection of the parts, and it would then be wiser to give the patient the chance afforded by the pegging operation, and to reserve reconstruction for those cases in which pegging has failed.

The outstanding point, about which agreement has not yet been reached, is the treatment of recent cases of fractured neck of the femur by open operation. If the patient is young and of active habits, then an operation successfully done within a few weeks of his accident will restore to him a limb perfect in structure and function. If, on the other hand, the closed method of reduction is used, and it fails, then the possibility of a complete *restitutio ad integrum* has gone. During the six months or a year that have been occupied in conservative treatment marked atrophy has taken place in the broken bone. It therefore follows that the late operation, even though it may succeed in producing bony union, can only eventuate in a deformed bone. To this consideration has to be added the fact that a young working man has lost twelve months which might have been saved by timely operation.

The following general principles may therefore be laid down about fractures of the true neck of the femur (intracapsular fractures): (1) These fractures never undergo spontaneous union. (2) In young active patients the case should be treated by a pegging operation within one or two weeks of the accident. (3) In those who decline operation or whose age and health make it unwise, the Whitman abduction plaster should be applied; Cotton's method of inducing artificial impaction should be adopted before putting on the plaster. (4) Cases of non-union should be treated by the pegging operation, reserving reconstruction of the hip-joint for those in which the pegging operation is impossible.

Ununited Fractures of the Humerus.—Of all the long bones of the body the humerus is the most liable to non-union after fracture. This has been variously explained, but it is probably in part due to the difficulty of fixation of the upper arm after a fracture. Probably by the use of a wire-frame abduction splint from the outset many cases of non-union of fractures of the humerus may be prevented. When non-union is established, it will tax the utmost ingenuity of the surgeon to cure it. The difficulties are partly vital and partly mechanical. The vital difficulties are the slender atrophied structure of the bone and its very poor blood-supply. The mechanical difficulties are those of access and of fixation. M. S. Henderson[9] has described a method of bone-grafting which is perfect in every detail. The humerus is exposed by a long incision extending from the deltoid to the supinator longus along the outer margin of the biceps muscle. The fractured ends of the bone are each exposed, thrust outside the wound, and a flat surface cut to receive the graft. The latter is cut from the tibia in the usual way, and is fixed in its bed by means of deep bone-screws (*Fig.* 14). Small chips of bone are packed round the line of fracture. [This method is, however, open to two criticisms. In the first place it involves a very wide separation of the bone from the soft parts, and this must tend to diminish its poor vascular supply. In the second place, it depends upon the bone having a fairly stout shaft, not only to form the bed for the graft, but also to afford a bite for the screws, whereas in most cases the shaft of an ununited humerus is thin and fragile.—E. W. H. G.]

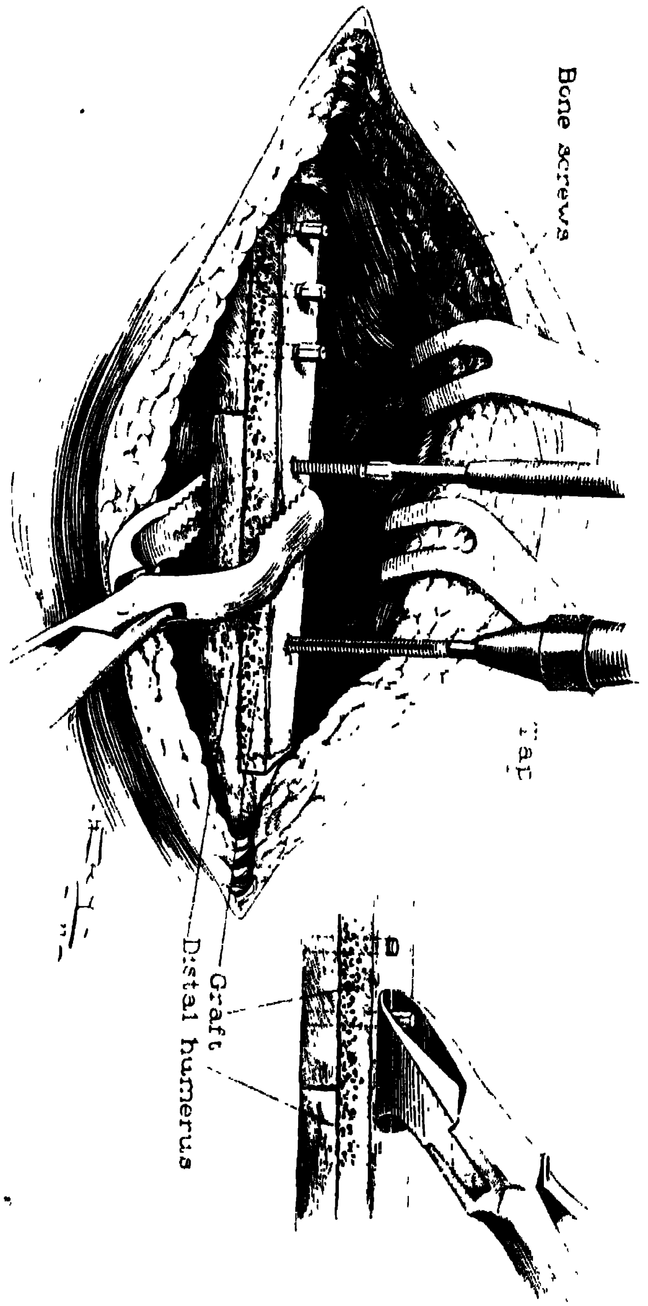

Fig. 14.—Massive bone-graft for ununited fracture of humerus. Drilling holes and placing bone screws. The right-hand figure shows the method of biting off the heads of the bone screws. (*By kind permission of 'Surgery, Gynecology and Obstetrics'.*)

Fractures about the Elbow-joint.—These fractures, though they vary very much in anatomical detail, all have certain broad points in common (excepting the fracture of the olecranon). They are common occurrences in childhood, produced by a fall upon the bent elbow. They usually result in a rapid swelling and ecchymosis about the elbow-joint. When once this swelling has occurred manipulative reduction is very difficult. They are very liable to be followed by a more or less stiff elbow, and rarely by Volkmann's contracture or myositis ossificans. N. Allison[10] has recently summarized the currently accepted teaching about these fractures, although in some details his statements are open to criticism. The treatment consists essentially in putting the arm up in flexion of the elbow, after reducing the displacement. But this reduction of the displacement can only be readily effected if the manipulation is done within a few hours of the accident. We think this point is important, because the modern tendency is to delay reduction whilst waiting for X-ray pictures. Thus, Allison says: "Haste is not necessary. Get Röntgen-ray plates which show two views of the region". We would venture to urge that if any injured elbow is seen directly after the accident, and if it presents the signs of fracture of the lower end of the humerus, then immediate manipulation under an anæsthetic should be done without waiting for X rays—that is, if the latter involves a delay of more than an hour. Another point of great importance is the degree of flexion which should be adopted and the manner in which this should be secured. Allison repeats the common phrase when he recommends 'acute flexion', and he quotes Ashurst as recommending 'hyperflexion'. But this extreme position of flexion is unnecessary and dangerous; acute flexion or hyperflexion means that the hand is brought up so as to touch the shoulder of the same side. It was by following this rule that a medical man recently[11] caused a loss of circulation and Volkmann's contracture for the patient, and a jury's verdict of negligence with £2000 damages against himself. The flexion should only be of moderate degree, the hand being secured so that the wrist lies just below the root of the neck, fixed in place by a cuff-and-collar sling. If the case is seen a day or two after the accident, an attempt should then be made under anæsthesia to effect reduction. But under these circumstances even more care should be taken than in the cases treated early, to prevent any interference with the circulation in the limb. The arm should never be left after manipulation in any position of tension unless the radial pulse can be felt unaffected. If after manipulation the X rays show that the bone is still in bad position, then it is far better to reduce it by open operation rather than to attempt further manipulation or trust to luck. The arm is opened by a posterior incision, the ulnar nerve is identified and retracted, the triceps muscle is divided obliquely, and the fracture is exposed. Full and perfect reduction can then be effected when the tension of the triceps muscle has been removed. If the lower fragment is comminuted, it may be wise to fix the separated pieces together by means of fine wire nails. In closing the wound the elbow should be placed in moderate flexion before the triceps muscle is sutured.

Fractures through the Ankle-joint.—In bad cases of Pott's fracture the lateral displacement is usually very obvious, but the equally important posterior displacement of the foot may be overlooked. Also after reduction, even though this has been complete, there is great danger of the foot slipping backwards unless special precautions are taken to prevent this. J. C. A. Gerster[12] has drawn attention to this point, and has described a method of suspension which meets the difficulty. He relies upon the application of adhesive plaster to the sole of the foot, and by this means the leg is suspended from the cradle. [The reviewer has described an even simpler method for effecting the same object in the 1927 volume of the MEDICAL ANNUAL (p. 171).—E. W. H. G.]

Fractures of the Calcaneum.—Fractures of the heel bone are usually caused by a fall on the feet from a height. Although they do not produce any gross deformity at the time, and may even be overlooked without the most careful X-ray pictures, yet they are liable to cause very troublesome pain and weakness in the foot, so that the patient, if a working man, is frequently made into a permanent cripple. The reason for this chronic disability after a comparatively simple fracture has not been very apparent. P. D. Wilson[13] has made a very practical suggestion as to both the cause and the cure of this condition. He attributes it to a chronic arthritis set up between the calcaneum and the astragalus. He suggests a fusion of this joint effected through an external incision, and reports the results of thirty-six cases.

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FUNGOUS AFFECTIONS OF SKIN. (*See* SKIN, FUNGOUS AFFECTIONS OF.)

FURUNCULOSIS. (*See* SKIN, STAPHYLOCOCCAL INFECTIONS OF.)

GALL-BLADDER AND BILE-DUCTS, DISEASES OF. (*See also* CHOLECYSTOGRAPHY.)

John H. Anderson, M.D.

Abnormalities.—The advent of cholecystography has given a new impetus to the study of the normal gall-bladder both as regards anatomical peculiarities and physiological activities. F. Davies[1] has shown that the size, position, rate of emptying, and respiratory excursion of the gall-bladder vary with the type of individual. The gall-bladder shadow is broader, higher placed, disappears more quickly, and presents more movement with respiration, in those of a massive build, heavy bony framework, short wide deep thorax, wide costal angle, good bowel tone, and whose alimentary canal is in good position.

B. R. Kirklin[2] notes three cases of rudimentary gall-bladder or congenital absence of the gall-bladder. It is not quite clear how many cases were included in his series, but as 506 came to operation it is probable the abnormalities were in this group, which gives an incidence of about 0·6 per cent. Congenital abnormalities of this organ are said to be frequent in animals but rare in man. S. Levine[3] does not agree with the latter part of this statement, as he has found three anomalous gall-bladders " in a rather small private practice . . . within a few months ". He has reviewed the literature, and records congenital absence of the gall-bladder (Huber), double gall-bladder (Sherren, Braun, Nicholls), and gall-bladder diverticula (Courvoisier, Staub, Sebening and Schöndube). Hour-glass gall-bladders and malformations of the extrahepatic ducts seem more common. It is interesting to note that in Huber's case there was also a " preternatural enlargement of the hepatic duct ". This fits in with F. C. Mann's work on animals, in which he demonstrated a great increase in the capacity of the ducts following cholecystectomy, and is in favour of an active part being played by the gall-bladder during digestion, rather than the passive rôle some observers seek to give it. With one exception the cases referred to above were found at operation or autopsy. Levine's three cases—one hour-glass gall-bladder, one resembling a 'Phrygian cap', and one rudimentary gall-bladder—were detected by cholecystography and none came to operation.

The interesting point arises as to whether these abnormalities described by Levine are congenital or due to disease. In 15 cases of hour-glass gall-bladder mentioned by Courvoisier, stones, or definite traces of their presence at some former time, were present in all. Malcolm and Hartmann incline to causation by disease, while Morton and Toida hold with the congenital origin of the hour-glass gall-bladder. Levine thinks that the congenital origin is plausible, and points out that " the presence of cholecystitis does not rule out the congenital nature of its anomalous form. Inflammation and stone formation may develop as a result of the abnormal shape of the gall-bladder, which interferes with its emptying." [The reviewer doubts this, for, as will be shown later, it is very doubtful if stasis alone is sufficient to produce stone formation. In two cases recently seen the hour-glass formation was due to extrinsic causes, namely bands which were removed at operation. A third case was even more interesting, for a bilocular gall-bladder was seen to be quite normal as regards shape and size when the cholecystogram was repeated a month later. It would appear, then, that cholecystographic evidence as to abnormal shape requires a second examination at least before it can be accepted.—J. H. A.]

Bartel in 1916 and 1918 reported forty-three cases where the fundus of the gall-bladder was bent up in such a way as to suggest a 'Phrygian cap'. In contradistinction to the previous type, only seven of the cases showed stone formation. Bartel concluded that this type of gall-bladder is associated with "constitutional inferiority". Levine agrees, for, as he records of his own case, "it is significant that she was never pregnant, although she had been married three and a half years, that three years before she stopped menstruating for six months, and that she was suffering with hyperthyroidism".

When we come to the 'rudimentary gall-bladder' we are on firmer ground regarding the mode of origin. The development of the gall-bladder is generally regarded as taking place somewhat as follows: When the protrusion from the foregut, which is later to form the liver, moves away, a strand is left between embryonic liver and foregut, which is canalized later to form the primitive common duct. A bud arises from a depression in this tube and later forms the permanent gall-bladder, the depression forming the cystic duct. The cells in the bud proliferate. forming a number of cavities. the septa between which break down finally to form one large cavity. the gall-bladder. "When the cavities fail to fuse properly, various congenital abnormalities may arise."[3] Rudimentary gall-bladders about the size of a goose-quill have been described, but as a rule they are accompanied by maldevelopment or obliteration of the bile-ducts, with subsequent cirrhosis and early death. In Levine's case the gall-bladder as seen by cholecystography was one-third the normal size, conical, the fundus tapered to a point, and it emptied abnormally slowly. Further, it is to be noted that the icteric index was high (8·2), and "his entire make-up strongly suggests the presence of developmental disturbances".

It would appear, then, that the rudimentary gall-bladder is almost certainly developmental in origin; the 'Phrygian cap' type (when not due to adhesions) may be associated with a general constitutional disturbance; but in the reviewer's opinion the hour-glass gall-bladder is more likely due to disease, intrinsic or extrinsic, than to a congenital defect.

Congenital abnormalities are not limited to the gall-bladder only, and B. C. Willis[4] draws attenton to *congenital cystic dilatation of the common bile-duct*, of which he has collected 60 cases from the literature, including one of his own. The condition is rarely recognized prior to operation (twelve times in all), and only 17 cases survived out of 58, where full records are available. The usual symptoms are recurrent attacks of jaundice, upper abdominal pain, and palpable cystic tumour, occurring during childhood or early adolescence. Fifty per cent of the patients were under 15 years of age, and there were nine males and fifty females (sex not stated in one case). Internal drainage by some procedure such as choledochoduodenostomy offers the best results when the cystic dilatation is discovered. In Willis's case the cystic mass was found lying between the spinal column and the right kidney, the wall was yellowish-white, thick, and fibrous, and bile was drawn off when the mass was aspirated. After evacuation of its contents (400 c.c. of normal-looking bile), the cyst was opened and the entrance of the cystic duct located. Both cystic and hepatic ducts were normal in size, and the upper part of the cyst began at their junction. No true common duct was seen, but some opening must have been present between cyst and duodenum, as the latter contained bile. It should be noted here that no jaundice was present in this case, which is unusual. As the cyst could not be removed, an opening 2 cm. long was made between it and the second part of the duodenum. The patient made an uneventful recovery. N. H. Hill and R. A. Ramsay think the condition follows a partial and intermittent obstruction to the outflow of bile, the obstruction tending to progress. They do not regard the cyst as congenital, but think it far more likely that the obstruction is the congenital abnormality and the cystic dilatation is secondary. Willis considers this a logical explanation, but points out that it does not explain those cases which develop late. These he thinks may be due to an associate duodenitis grafted on a congenitally narrowed duct.

Mode of Emptying of the Gall-bladder.—A weight of evidence is accumulating to show that the gall-bladder has a definite share in evacuating its contents, and that its emptying is not entirely due to extrinsic causes or to the elastic recoil of its wall. Those who urge that the gall-bladder plays a purely passive part in emptying itself quote the opinion held by almost all surgeons that the human gall-bladder has never been seen to contract on the operating table. E. A. Boyden[5] admits this, but points out that owing to the absence of food in stomach and duodenum there is no sustained stimulus for contraction. He argues further that the very condition under which the observation is generally made—mechanical manipulation, chilling, and general anæsthesia—are exactly those which inhibit rhythmic contractions of the organ. I. S. Hirsch and H. K. Taylor[6] state definitely " no one has seen the human gall-bladder contract ". I. Matsuo,[7] however, in 1924 described two occasions on which he had seen this occur, the abdomen being opened under local anæsthesia and magnesium sulphate instilled into the duodenum. Boyden accepts this evidence, and states that he has frequently seen the gall-bladder contract in cats when the abdomen is opened under local anæsthesia and after injection of adrenalin. The contraction consists " of a slow puckering of the surface . . . and a gradual withdrawal of the whole vesicle from the margin of the fossa in which it lies ". G. M. Higgins and F. C. Mann have seen the same thing in guinea-pigs, and noted that contraction was increased by stimulation with an induction current.

Physiologists have long recognized that the ingestion of mixed food produced a flow of bile from gall-bladder to duodenum, and in 1923 Boyden demonstrated in cats that this took place best after a fatty meal, such as egg-yolk and cream. With the aid of cholecystography it has now been shown that the same cycle obtains in human beings, and even that there is a sex variation, the female gall-bladder discharging faster than the male.[8] The first contraction takes place within two minutes of food entering the stomach, and Boyden finds that " the human gall-bladder is designed to empty the bulk of its concentrated bile during the first hour of digestion, and completes its work as a rule before the secretion of the bile from the liver reaches its maximum flow ". The diminution in size as seen by cholecystography is too rapid to be accounted for simply by concentration within the gall-bladder, and this statement receives support from experimental observations made by L. R. Whitaker.[9]

That the gall-bladder does empty itself of bile seems established, and the question then arises, How does this take place? Several theories have been advanced, such as respiratory and intra-abdominal pressure, swelling of the liver by vasodilatation, sucking action by intestinal peristalsis, flushing action of hepatic bile as it passes the orifice of the cystic duct, recoil of the elastic gall-bladder wall, and lastly direct action by the contractile force of its muscular coat. Boyden holds that there is sufficient smooth muscle present to expel the bile. Repeated experiments at the hands of different workers have shown that this smooth muscle conforms in its actions to smooth muscle elsewhere in the body, and that it possesses the power of rhythmic contraction. With X rays the visualized gall-bladder has been seen to change in shape following the ingestion of food both in humans and animals. In addition, in animals, actual expulsion of the contents of the gall-bladder in response to smooth-muscle drugs and food has been recorded under experimental conditions which rule out the action of extrinsic forces such as have been enumerated above. Boyden's conclusion, that in man "bile is expelled primarily by the contractile force of the muscle tunic of the gall-bladder", is supported by a wealth of evidence, and seems reasonable. Whether it is the only force acting, and how it is brought into play, still remain to be seen. There is clinical evidence that supports movement as being a factor, but no proof as to whether it is a primary cause or merely a secondary concomitant.

A. H. Potter[10] does not think the gall-bladder is an active organ in bile excretion, but regards the discharge of bile as in the nature of an overflow incontinence. His main argument in favour of this—namely, the small amount of smooth muscle in the wall of the gall-bladder—is a matter of opinion, which does not seem able to controvert the arguments brought forward by Boyden, Mann, Matsuo, Whitaker, and others.

Causation of Cholecystitis.—With the growth of preventive medicine, more interest than ever is being evinced in the mode of causation of so common a disease as cholecystitis; until this is settled much of the treatment advocated must of necessity rest on an insecure basis. Experimental work on animals is throwing light in dark places, and a better conception of the problem is being gradually obtained. A. H. Potter[10] considers that stagnation of bile is the main predisposing cause of infection. B. B. Vincent Lyon[11] thinks mucosal catarrh, stasis of bile, and infection produce, directly or indirectly, all diseases of the gall-bladder, with the possible exception of cancer. G. H. Copher and C. F. W. Illingworth,[12] working with cats and dogs, were unable to cause cholecystitis even when marked biliary stasis was present and organisms such as *B. coli*, staphylococci, and streptococci were introduced into the lumen of the gall-bladder. Within certain limits this experiment fulfils two of Lyon's postulates. Illingworth[13] suggests, however, that the mere presence of infection in itself is not sufficient, but for disease to ensue such infection must be intramural. That this is more than likely is proved by investigations carried out at Edinburgh by A. L. Wilkie.[14] Working on human gall-bladders showing all stages of cholecystitis, he found that when the entire wall was cultured results were unsatisfactory, for in the great majority of cases no organisms were recovered. When the culture was limited to the submucous and outer coats a streptococcus was present in 42 per cent of cases. Subsequent investigations showed that previous cultures had been negative owing to the inhibiting action of the bile clinging to the mucous membrane. If the cystic lymph-gland was cultured, a pure growth of streptococci was obtained in 86 per cent of cases. Furthermore, in those cases where growth was obtained from both cystic lymph-gland and submucous layer, the resulting organisms were similar. Streptococci obtained in this way were repeatedly injected into the lumen and wall of the gall-bladders of rabbits. When put into the lumen, no disease resulted and the bile soon became sterile. Following the intramural inoculation, however, a typical chronic cholecystitis developed, the gross and microscopic picture of which "corresponded in every way with the changes seen in the gall-bladder in chronic cholecystic disease". Wilkie then went a stage farther, and by intravenous injections of these organisms into rabbits produced a typical chronic cholecystitis with intramural changes. In certain of the experimental animals calculi appeared, the chemical composition of which seemed to depend on the occlusion or otherwise of the cystic duct. "If this duct remained patent, the stones were composed of cholesterol only. If the duct were occluded, calculi formed more quickly and were composed of cholesterol and calcium. Stasis therefore seemed to be necessary for the precipitation of calcium, whereas the intramural inflammatory process alone was sufficient for cholesterol calculi formation." Cholecystitis in rabbits also followed intravenous injection after the gall-bladder had been dissected from its bed and the cystic duct tied (not including the cystic vessels), thus proving that infection came by way of the cystic artery. Wilkie's conclusions are as follows: "We must assume that this streptococcus is in all probability the cause of human cholecystitis, that it reaches the gall-bladder by the blood-stream, and sets up chronic intramural changes. What takes place within the lumen of the gall-bladder is in all probability secondary and of minor importance, and depends upon the degree of occlusion of the cystic duct. Whether the organism produces a type of immunity or not is at present difficult to say, but a point not without interest along this line is the fact that the first intravenous inoculation acts only as a sensitizing dose." This work must have an important effect on prophylaxis and both medical and surgical treatment of cholecystitis, and will direct fresh attention to the gall-bladder as a source of focal infection. It strongly confirms Rosenow's theory of the selective affinity of organisms and, in addition to the light it throws on the etiology and treatment of cholecystitis, must exercise an important influence on our conceptions of the bacteriology of body inflammations in general.

Miscellaneous.—

Age Incidence of Gall-bladder Disease.—B. B. Vincent Lyon[11] draws attention to the fact that cholecystitis and even gall-stones are frequently encountered in children or very young adults. A. H. Potter[10] has studied the reports of 25,000 cases of gall-bladder disease from the point of view of age incidence, and finds the average age at operation to be 36 years for females and 39 years for males. He considers the start of the disease to be on the average at 30 years in the female and at 34 years in the male. He does not agree that gall-stones are unusual before 35 years of age, and his review of the literature has shown that such calculi have been found at all ages, from that of a 6-months fœtus to a patient of 86 years.

Relative Accuracy of Cholecystography and Diagnostic Duodenal Drainage in the Detection of Cholelithiasis.—G. M. Piersol, H. L. Bockers, and H. Shay[15] show better results with the duodenal tube, and draw especial attention to the presence of a characteristic pigment which they consider of significance in the diagnosis of gall-stones. On the other hand, W. W. Boardman[16] found duodenal biliary drainage less dependable than cholecystography.

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GALL-BLADDER, SURGERY OF.

A. Rendle Short, M.D., F.R.C.S.

Physiology and Pathology.—Sir Berkeley Moynihan[1] attributes the emptying of the gall-bladder to a complex mechanism, in which muscular contraction, elasticity, and the Sprengel-pump action of bile passing along the common

bile-duct all play a part. It is now well recognized that the mucosa both absorbs and excretes. Infection of the gall-bladder takes place through the blood-stream, by direct extension from a pre-existing hepatitis by way of the lymphatics, and by ascent of the bile-ducts from the duodenum. The fact that the wall is more often found infected with germs than the bile is in favour of the frequency of the second route rather than the third, and it is well known that hepatitis often accompanies cholecystitis. Other possible sources are from the liver by way of the descending bile, or from the spleen. Small gall-stones are usually transparent to X rays, but as they grow older calcium is deposited on their surface. With pure white cholesterin stones the mucosa is little altered; when calcium is deposited, there is generally inflammation. The sequence of events appears to be as follows: (1) Infection reaches the gall-bladder wall. A 'cholesterol flood' results, and by its absorption hypercholesterolæmia develops. (2) The mucosa becomes gorged with cholesterol, forming the so-called 'strawberry gall-bladder', or, to give its modern name, 'cholesterosis'. (3) Cholesterol stones now form in the lumen. Sometimes, through concentration of the cholesterol-laden bile, a shower of crystals comes down and covers the wall. (4) The growth of the stones, and perhaps impaction, results in secondary damage to the gall-bladder wall, with fat deposit, fibrosis, chronic thickening, adhesions, etc. The hypercholesterolæmia now ceases as absorption fails. The corollary will be that drainage methods cannot work a cure if the infection commences, not in the bile itself, but in the wall of the gall-bladder.

DIAGNOSIS.—J. B. Carnett,[2] who has been quoted in the article on APPENDICITIS as writing in favour of the view that many cases of so-called chronic appendicitis are really suffering only from intercostal neuralgia, advances the same thesis to explain the symptoms of many patients supposed to have cholecystitis or gall-stones. He maintains that even when a diseased gall-bladder is found and removed, the symptoms may persist, because the cause was all along a neuralgia. The test to detect the neuralgia is to palpate with the abdominal muscles rigid. If the tenderness is still present, the cause lies in the parietes, not in the viscera. Pinching up a big fold of skin, or firm pressure on the nerve-trunks, will also detect intercostal neuralgia.

Schrager and Ivy[3] advance evidence that when biliary colic is associated with respiratory embarrassment, the gall-bladder is distended. Animal experiment confirms this.

TREATMENT.—J. R. Verbrycke, jun.,[4] reports a series of 86 cases of removal of the gall-bladder with no deaths; of 27 followed up, 21 were entirely free from further trouble. He attributes this good success to avoiding operation during the acute stage, and to closing the abdomen without drainage. M. Kappis and E. Fulde[5] advise as to the *best time for operation*. If fever and rigors persist with jaundice, the operation should be on the third or fourth day after the jaundice appears; in obstructive jaundice without fever, if the obstruction is complete, the end of the second week is the right time, or if the obstruction is incomplete or intermittent, not later than four weeks. R. Colp[6] points out that in his series of 114 cases of obstruction, usually due to stone, of the hepatic or common bile-ducts, those which had a smooth convalescence had been jaundiced on an average 9 days before the operation, those with a stormy but successful convalescence averaged 11 days, and those who died, 24 days, of pre-operative icterus. He examines the arguments which have been advanced for sewing up the common bile-duct after removing a stone, with or without internal drainage into the duodenum by a tube through the ampulla of Vater, but concludes that external drainage of the duct, though imperfect, is safest. He advises that the gall-bladder in such cases should usually be left, as the additional trauma may be too much for the patient. Twenty-seven died and 87 recovered.

B. O. Pribram,[7] of Berlin, discussing his experience with his last 200 cases of gall-bladder surgery, strongly advocates closing all without drainage. To avoid oozing from the bed of the gall-bladder in the liver after cholecystectomy, he destroys all the mucous membrane with a cautery, and then closes the empty shell, consisting of the muscular and serous layers, with sutures. This he calls '*mucoklase*'. All varieties of conditions are included in his 200 cases, with the usual proportion of stones in the common duct, empyema of the gall-bladder, simple cholecystitis (31 cases), etc., but the total mortality was only 4.

C. G. Heyd[8] refers, as he has done before, to his experience of three types of mortality occurring after cholecystostomy or cholecystectomy, often a straightforward and easy operation in an apparently well woman. In the *first type* the patient never recovers consciousness properly, becomes stuporose and comatose, and dies in twenty-four or forty-eight hours. This appears to be an alkalosis. In the *second type*, usually jaundiced to start with, patients go on well for five or six days: then, as the jaundice lessens with the draining away of the bile, they become delirious, excited, then drowsy, and die, the discharge of bile meanwhile becoming less and less, and more watery. The suggested cause of death is failing hepatic function. In the *third type*, often following a second operation for relapsed stones or recurring symptoms, and usually without jaundice, they do well for a day or two and then the blood-pressure fails, with quick pulse, clammy extremities, reduced urine, etc. These can sometimes be saved by transfusion, or by intravenous saline and glucose. It is probably wise to clamp the drainage-tube when the common duct is being drained, for an hour every four hours, to reduce the rapidity of the flow. Heyd comments, as other surgeons have done, on the not infrequent occurrence of an acute attack like biliary colic a fortnight after a gall-bladder operation. It is probably due to cholangitis, and fortunately it is not likely to happen again.

Operative Mortality and End-results.- A very large number of surgeons have given us their figures of late years. B. B. Davis,[9] of Omaha, reports 160 cases of gall-bladder surgery with 6 deaths, i.e., 3·75 per cent. Nearly all the operations were cholecystectomies. Of 144 cases followed up, there were: cured, 100 (69·4 per cent); relatively cured, 31 (21·5 per cent); improved, 7 (4·9 per cent); unimproved, 6 (4·2 per cent). [One observes that this surgeon has 69 cases of cholelithiasis to 75 of cholecystitis, which makes one suspect that he removes gall-bladders for less serious evidences of disease than most English operators.—A. R. S.]

Statistical end-results often err from too short a period of following, so F. G. Connell[10] has analysed 99 cases all operated on prior to the end of 1920, and some as far back as 1910. The majority were cholecystostomies. Symptoms returned in 40 cases (40·4 per cent); of these, 44·7 per cent of the cholecystostomies relapsed, and 31·2 per cent of the cholecystectomies. In 14 cases a secondary operation was done, half of them being relieved. These results are disappointing, and it would be well to compare them with other really late series.

Cholecystitis without Gall-stones.—The general experience is that drainage does not relieve this condition as a rule, and though the results of cholecystectomy are much better, they are not so good as when stones are definitely found and removed. G. P. Muller,[11] of Philadelphia, finds that of 42 followed up, mostly treated by removal of the gall-bladder, only 76·2 per cent were cured. He admits that in some of his cases the gall-bladder was probably not the organ at fault.

E. L. Young, jun.,[12] has also investigated the end-results in 115 cases at

Massachusetts General Hospital, nearly all treated by cholecystectomy. Of these, 63 per cent were cured, 15 not cured, and 22 per cent relieved. The gall-bladder, on palpation and inspection, was in 14 cases found to be little if at all diseased; some of these were cured, some were not. In the discussion Lahey advocated removal of the apparently normal gall-bladder if it should be found at exploratory laparotomy, when cholecystitis has been diagnosed clinically. Olch, at Graham's clinic, claims that when the gall-bladder has been proved diseased by cholecystography, removal cures in 100 per cent of cases, but this claim will have to be substantiated by experience.

V. Hoffmann[13] says that the symptoms in this condition are apt to be vague, the most prominent being flatulent dyspepsia, especially after eating fats. There is tenderness over the right hypochondrium. At operation the serous coat is dulled and the walls are thicker than normal. Pericholecystic adhesions, in the absence of disease in the stomach or duodenum, are to be taken as proof of cholecystitis. Microscopical examination shows polypous enlargement of the villi and small-celled infiltration of the mucosa, but no germs are found. If the condition is not relieved by rest in bed, local radiant heat, low diet, and **Cyclotropin** (which often succeeds), the gall-bladder should be removed.

Perforation of the Gall-bladder. In describing 20 cases, E. G. Alexander[14] says that they form 2 per cent of the total number of gall-bladder conditions treated during the same period. Eight were examples of *acute perforation*, 3 being due to typhoid fever, and 1 traumatic. The diagnosis was seldom made. Jaundice was absent. The clinical picture resembled that of perforated gastric ulcer. All were operated on: 4 died and 4 recovered. The gall-bladder was drained in some, removed in others. The rest were cases of *subacute perforation*. The clinical picture was more like that of gall-bladder cases, sometimes with jaundice or incessant vomiting, and the perforation resulted in a localized peritonitis around the perforated organ. They were generally thought to be empyema of the gall-bladder, as there was a tender palpable swelling and fever. Again half the patients died. Simple drainage of the abscess is the wisest course as a rule. The gall-bladder may be drained or removed, but the latter is too severe.

Chronic Jaundice not due to Stones. The great majority of these patients are, of course, suffering from cancer of the head of the pancreas or of the bile-duct. Others have chronic pancreatitis. There is a small group, mostly seen in young women, in which the obstruction may be due to enlarged lymphatic glands pressing on the common duct (two cases) or to acute inflammatory swelling of the ampulla of Vater (one case). Removal of the cause in each of these caused the jaundice to disappear (Rendle Short[15]). H. Herfarth[16] has had two cases of chronic jaundice due to prolapse of the mucosa of the bile-duct through the ampulla of Vater, verified at autopsy. R. T. Miller, jun.,[17] reports another case of benign stricture of the bile-duct with chronic jaundice, and with no gall-stones.

Heyd[8] believes that patients with obstructive jaundice ought to have the benefit of surgical relief much more frequently than they do at present, when malignant disease is suspected. Sometimes nothing more serious than chronic pancreatitis will be discovered. Even if there is cancer, it may be removable, or the pruritus and distention will be relieved and the jaundice abated. The gall-bladder should be anastomosed to the stomach or duodenum. If exploration reveals a cancer of the ampulla of Vater, it may be removed through the duodenum (Kappis and Fulde).

O. Lambret[18] finds that anastomosis to the duodenum is preferable to cholecystgastrostomy. Of 22 cases, 10 were cured and 8 relieved. He attributes the less satisfactory results to reflux of the duodenal contents into the gall-bladder, and to avert this has devised a technique in which the opening is made valve-like by a method analogous to Witzel's gastrostomy, a few Lembert sutures in the duodenal wall covering over the fundus of the gall-bladder. Five cases treated thus have done well.

L. Moszkowicz,[19] of Vienna, describes a technique for enlarging the ampulla of Vater to secure drainage of the common bile-duct into the duodenum, when symptoms return after cholecystectomy, when a small stone in the ampulla cannot be dislodged from without the duodenum, and when the bile is infected and muddy, because even prolonged drainage externally in these cases is apt to be followed by recurrence of cholangitis when the drain is removed. He opens the common duct above the duodenum, and then opens the duodenum through an anterior incision. A forceps is passed down the bile-duct to the ampulla to locate it. Adrenalin is injected into the ampulla to render it bloodless, then a fold of mucosa is raised to form a flap, leaving an orifice large enough to admit a finger if the common duct is dilated. This is left open for perpetual drainage into the duodenum. The incision in the duodenal wall and that in the bile-duct are then sutured.

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GASTRIC AND DUODENAL ULCER.

Robert Hutchison, M.D., F.R.C.P.

Etiology. Erich v. Redwitz,[1] in a rather theoretical review of this subject, expresses the opinion that up to the present investigators have been too much concerned with trying to discover one single cause for peptic ulcer. He believes that it is, on the contrary, a disease of multiple causation, and that constitutional factors, trauma, infection, and dietetic influences all play a part. He illustrates his view by a rather complicated schema showing how the different factors may interact.

Symptomatology.—It is now well recognized that the symptoms of duodenal ulcer are usually quite characteristic, and that a diagnosis can, in the majority of cases, be made from the history alone. Irving Gray,[2] however, points out again that the usual symptom-complex may be present and yet no ulcer be found by X-ray examination or at operation. He found this to be the case in one-third of a total of 250 cases in which the history pointed to ulcer. He mentions cholecystitis, chronic appendicitis, and neurosis as prominent among the simulating conditions. In no fewer than 41 per cent he attributed the symptoms to tobacco. Smoking, especially on an empty stomach, has often been accused before of causing hunger-pain, but it is interesting that C. W. Barnett,[3] from an investigation of the records of the Peter Bent Brigham Hospital, concludes that "there is no proof that smoking is of any importance in the etiology of peptic ulcer or gastric neurosis, nor that it has any effect upon the age of incidence of gastric or duodenal ulcer".

Just as the symptoms of ulcer may sometimes be present when no ulcer is there, so occasionally an ulcer may be present in the absence of symptoms. These 'silent' duodenal ulcers are fairly well recognized, but Meyer Golob[4] has published four cases from his practice. The gastric acidity in these silent cases may be normal or even subnormal (hence, probably, the absence of pain), and they can only be recognized by radiography. Hæmorrhage, perforation, or the gradual supervention of pyloric stenosis may be the first indication of their presence.

Treatment.—The reaction in favour of the medical treatment of gastric and duodenal ulcer which has been noticeable in recent years has received a further impetus by the publication of a paper by Hugh MacLean.[5] He shows that by '**Intensive Alkaline**' **Treatment** ulcers can be made to heal, and that the healing can be demonstrated by the X rays. There is, of course, nothing new in this, for the same thing has often been shown before both in this country and in America, but the comparative simplicity of MacLean's method makes a strong appeal to the general practitioner. He describes it as follows :—

"Sufficient 'alkali' must be given to prevent the presence of free hydrochloric acid in the stomach for some time. The substances generally used to neutralize the acid are sodium bicarbonate, magnesium carbonate or oxide, and calcium carbonate. In America magnesium-ammonia phosphate has been frequently used, and a mixture of calcium phosphate and magnesium phosphate has been recommended by Shattuck, Rohdenburg, and Booker. Sodium bicarbonate being very soluble is an excellent antacid, but has the disadvantage that it tends to produce a secondary increased flow of acid. It is not satisfactory to use this substance alone, but when associated with less soluble bodies such as magnesium and calcium carbonate a very satisfactory mixture is obtained. It does not matter very much what combination of 'alkalis' is used, but the following powder will be found to give excellent results :—

℞	Sod. Bicarb.	℥ss	Calc. Carb.	ʒj
	Mag. Carb. Pond.	℥j	Bism. Oxycarb.	ʒij

"It is important to have the bowels fairly free, and usually the above mixture, when given as directed, will produce a free bowel movement. Should this be too free, some extra bismuth carbonate may be given, while, on the other hand, if constipation should prove troublesome, extra 'magnesia cream' may be given in doses sufficient to overcome the difficulty. Bismuth carbonate does not neutralize acid to any appreciable extent under ordinary conditions unless the acid is in greater concentration than is usually found in the stomach. It does, however, seem to possess some beneficial effect in gastric lesions, and is very useful in regulating any diarrhœa that may be present. Calcium carbonate is an excellent antacid with little effect on the bowels; magnesium carbonate, on the other hand, tends to act as a mild purgative, but is a good neutralizer of acid.

"In order that the powder should have its maximum effect the patient should be put on liquid diet for a week or longer according to the severity of the condition and the intensity of the symptoms. Pain usually disappears within forty-eight hours, and the patient feels comfortable. If definite symptoms persist after two or three days' treatment it is probable that the condition is not an ulcer, or that adhesions to adjacent organs are present. The important point in treatment is to make certain that sufficient alkali is given to control gastric acidity. This is generally quite easily done during the daytime, but may be more difficult to accomplish during the night. It usually happens that the patient sleeps well if the acid is satisfactorily controlled, but if this is not the case he often wakes up complaining of pain and discomfort. It is therefore necessary to warn the patient that he must take a dose of the powder when he wakes up with feelings of discomfort. By this means the difficulty of preventing accumulation of acid during the night may be overcome.

"Though it is best to have the patient in bed during the early stages of treatment, this is not always necessary, and we have treated many patients with success in the out-patient department. After some weeks of treatment the amount of powder given is gradually reduced. Patients with duodenal ulcer should, however, take the powder three times a day for two to three months. One most important point is to warn the patient that he must resume taking the powder and go on to liquid diet for a few days if any symptoms return. By this means an attack which might otherwise prove troublesome can be cut short. Patients who have had ulcers are sometimes liable to attacks of dyspepsia when they get run down, or after some infection such as influenza, but these attacks do not mean that there is a recurrence of the ulcer.

"Though the exact details of treatment may be varied to suit different patients, the following general scheme will be found useful in the majority of cases :—

"*First Week.* –The patient is kept on a fluid diet consisting of milk, or milk with Benger's food. About three pints of milk per day are given in feeds of approximately 8 oz. every two hours. It is important, especially during the earlier part of the treatment, to prevent the clotting of milk in the stomach, and in order to ensure this 10 gr. of sodium citrate are added to each feed of milk. This, of course, acts as a neutralizer of acid as well as an anticoagulant. A small teaspoonful of the 'alkali' mixture described is given every two hours shortly after the milk. The powder is best swallowed in a little water; care must be taken to stir the mixture thoroughly immediately before drinking. The powder is practically tasteless. About six to seven doses of powder are given per day. In addition, a double dose is given immediately before going to rest at night. The patient is warned that if he wakes up at night with any pain or discomfort he must take an extra dose of powder, or more than one dose if necessary.

"Generally, it is quite easy to control the acidity by the above procedure, but in a few severe cases it is difficult. This failure to control the acidity usually becomes obvious to the patient by a return of the pain or discomfort. When this happens the patient must always take an extra powder; if the pain is due to insufficient neutralization it is immediately relieved by this extra dose.

"In severe cases it is a good plan to give rather a smaller dose of the mixture every hour, for a two-hourly interval may allow of the passage of the whole of the powder from the stomach, with the result that free acid may be present. In ordinary cases one or other of the above methods will generally give the desired effect. With patients suffering from renal disease or pyloric stenosis, slight modifications may be advisable.

"*Second Week.*—If the patient has had no pain or discomfort for several days a little solid food is now added. If any discomfort or pain still persists, the procedure of the first week is continued for a few days longer. If there are no symptoms the powder may now be reduced to five or six times a day, the quantity of milk being somewhat reduced also. Two or three eggs are now added to the milk and beaten up, or lightly boiled eggs are given. This is followed by small amounts of toast and butter, and cream. The diet is then gradually increased until by the end of the week the patient is taking, in addition to his milk, a certain amount of toast, plain biscuits, butter, eggs, custards, a little porridge, and weak tea. A dose of powder immediately before retiring is taken as before, and the same care to take a powder during the night if pain occurs is still necessary; also an extra powder must be taken if pain or discomfort occurs during the day. Indeed, it is very important during all stages of the treatment that any discomfort arising by day or night should be immediately checked by a dose of powder.

"*Third Week.*—Powder reduced to four or five times a day, and at bedtime. Food is gradually increased and should now consist largely of eggs, cream, toast, butter, plain biscuits, rice and other cereal puddings, porridge, custards, a little steamed white fish, and a small amount of potatoes. Sodium citrate need no longer be added to any milk taken.

"*Fourth, Fifth, and Sixth Weeks.*—Milk is taken only in the usual average quantities. Powder is reduced to three or four times a day and at bedtime if no pain or discomfort is present. Food is still further increased with the addition of chicken, preferably creamed to begin with. In the fifth week a little meat (mutton or veal) may be taken, but only a small amount. By the end of this time the patient is taking a simple, nourishing diet, and the ulcer should be healed or well on its way towards healing. All the symptoms should have entirely disappeared in the average case.

"AFTER-TREATMENT.—The powder should be taken two or three times a day for another six to ten weeks. If there is an entire absence of symptoms the powder may then be given up during the day, but a dose should be taken at bedtime for several months. If any symptoms persist the powder should be taken two or three times a day for several months. A powder containing a suitable amount of magnesia may be taken at bedtime as a laxative for years without doing the slightest harm. It is impossible to give exact directions with regard to the length of time the powder should be taken, for this differs in different patients. It is, however, better to err on the safe side and to continue the powder for a long time if there is any evidence of dyspepsia.

"It goes without saying that any source of infection, such as septic teeth or tonsils, should be attended to. Whether or not the wholesale extraction of teeth, so largely practised to-day, is an advantage or otherwise is a point for discussion.

"*Diet.*—Much of what is written regarding diet is purely empirical and has no scientific basis in fact. Indeed, for many of the statements made in the literature there can be no foundation whatever. Rules regarding diet can be made quite simple, and may be summarized as follows: (1) The patient should avoid any article of food which would tend to cause physical irritation in the stomach. Now since raw vegetables are not digested to any appreciable extent in the stomach they should not be taken. Salads are therefore prohibited. The same applies to such articles as currants, raisins, nuts, or anything that would tend to leave an undigested residue in the stomach. If this principle is remembered the patient cannot go far wrong. (2) Meat, which tends to cause a marked secretion of gastric juice, should not be taken except in small amounts. Beef-tea and meat extracts of all kinds should be avoided. (3) Great care should be taken never to take too large a meal at one time, for this often tends to bring on symptoms. (4) The food should be thoroughly well masticated, so that it enters the stomach in a homogeneous pultaceous mass.

"*Smoking and Alcohol.*—Excessive smoking is a very frequent cause of gastric symptoms, and the less tobacco is indulged in the better. It should be given up entirely for a time. Alcohol should be avoided, for it tends to excite the flow of gastric acid, which is so injurious to patients suffering from ulceration.

"OTHER CONSIDERATIONS.—When the above treatment is carefully carried out as indicated, no other therapy is necessary in the average case. The tendency to excessive secretion of acid can sometimes be controlled to some extent by giving fats or oils. For this purpose they are of little value unless given on an empty stomach between meals, but if the patient can take olive oil, a dessertspoonful, two or three times a day, shortly before meals, may prove useful. Cream acts in a somewhat similar manner.

"Various other measures may be used, but it is unnecessary to discuss them here. Probably **Belladonna** is the most useful drug, but it is seldom necessary. The value of tonics and good general conditions as part of after-treatment is obvious."

MacLean believes that by this simple treatment permanent healing of the ulcer can be brought about. The majority of his cases, however, had not been sufficiently long under observation to justify this contention. More important in this connection is a paper by L. J. Barford[6] describing *inter alia*, the end-results in the treatment of all the cases of chronic gastric and duodenal ulcer admitted to the New Lodge Clinic since its inauguration in 1921 —160 in all. In the gastric cases the results of medical treatment were quite satisfactory in 39 per cent, fairly satisfactory in 13 per cent, whilst one-third had recurrences. Of the duodenal cases the results were entirely satisfactory in 41 per cent, fairly satisfactory in 28 per cent, and 24 per cent had recurrence, over half of which ultimately required operation. Considering that these results were obtained in private patients treated under the best conditions, they must be regarded as disappointing, and they compare unfavourably with those of the best operators.

Apropos of the alkaline treatment of ulcer, C. R. E. Freezer, C. S. Gibson, and E. Matthews[7] have investigated from the chemical point of view the efficiency of different 'alkalis' as therapeutic agents. They find that **Tribasic Magnesium Phosphate** is the most effective rapid neutralizer of gastric acidity, although tribasic calcium phosphates, the citrates, and calcium carbonate are almost equally good. (The tribasic phosphates are now on the market under the name 'Calsoma.')

R. Schindler[8] describes the results of treatment in 39 cases of gastric ulcer by intravenous injections of '**Novoprotein**'. The majority of the patients were not kept in bed, but their diet was regulated and they received in addition considerable doses of **Alkali** and **Atropine**. He claims to have had 87·5 per cent of cures (in a total of 34 cases), but none of them had been more than three years under observation. This is all too short a time to justify one in speaking of an ulcer case as cured, and the author's statement must therefore be taken with some reserve.

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GASTRIC AND DUODENAL ULCER, SURGERY OF.

A. Rendle Short, M.D., F.R.C.S.

The output of literature on this subject in American journals is enormous, and of very unequal value. Of necessity a good deal must be passed over.

Causation of Duodenal Ulcer.—C. B. Morton[1] finds that in dogs typical ulcers just beyond the pylorus may be induced by resecting a long loop of duodenum, closing the upper end, anastomosing the lower end into the ileum, and joining the jejunum end-to-end to the pyloric end of the stomach. The dogs maintain their nutrition, but the jejunum just beyond the pylorus shows ulcers, evidently due to the action of gastric juice unneutralized by bile and pancreatic juice. The ulcers heal after gastro-enterostomy.

Diagnosis.—D. P. D. Wilkie[2] points out that duodenal ulcer is becoming very common in women, but the symptoms are less well defined than in men. Typical hunger-pain is often absent, and there is what he calls the cholecysto-duodenal syndrome, with wind, pain unrelated to food, vomiting, and perhaps even a little yellowness of the skin. Naturally the physician thinks of gall-stones. Of course a woman about the house has much better opportunities for eating at odd times than a man at work. The diagnosis is given by a negative cholecystogram, and spasm of the duodenal cap after barium skiagraphy.

Medical or Surgical Treatment?—C. A. Pannett[3] discounts the claims of enthusiasts on the one side and the other. It is undeniable that many cases will heal under medical treatment, and it should always be given a fair trial; but a large number of the apparent cures will relapse later. He thinks, on the authority of Forman, that about half fail.

Operations on the Nerves of the Stomach.—N. N. Nazaroff[4] recommends

Injection of Alcohol into the gastric nerves in the lesser omentum and painting it on the three main gastric arteries. The method is effectual for gastralgia of uncertain origin, and for pyloric ulcer (with gastro-enterostomy). It took away all pain in four cases of inoperable cancer. B. Schiassi,[5] of Modena, has divided the nerves to the stomach in cases of gastric ulcer by a technique not unlike that referred to in the MEDICAL ANNUAL for 1927 (p. 192). In 8 patients this was done with a gastro-enterostomy and in 6 without; all were cured.

Choice of Operation.—There is the usual conflict of opinion as to the wisdom of relying on gastro-enterostomy in the treatment of gastric or duodenal ulcer, or of resorting to partial gastrectomy or excision of the duodenum. Henri Hartmann[6] considers that if **Gastro-jejunostomy** is only done when it is exactly indicated, and the technique is good, it is very satisfactory, even for ulcers of the lesser curvature. Only 27 of his own cases, out of 50, were perfectly satisfactory from first to last, but many of the others improved as time went on. H. J. Paterson[7] also advocates simple proximal gastro-enterostomy, unless there is any suspicion of malignancy. He maintains that only about 2 per cent of patients who have had a gastrojejunostomy eventually die of cancer. In his practice the statistics of mortality and end-results are as follows:—

STATISTICS OF GASTROJEJUNOSTOMY, 1913-23.

Recovered		495	
Died		4	
Died since*	33	410	82 per cent
Fairly well	61		
Quite well	316		
Bad result		37	
Untraced		48	
Gastric ulcer		172	
Duodenal ulcer		323	
Gastric- duodenal		4	

* Cured of gastric trouble.

It will be seen that 82 per cent may be regarded as cured, and only 7 per cent are unsatisfactory. In duodenal cases the percentage of cures is 90 at least. H. B. Devine,[8] of Melbourne, says that these sanguine surgical opinions are due to the fact that the operator regards as cured many patients who suffer from so-called neurasthenic symptoms, and who are really the victims of nausea and discomfort. In his own experience, in about 10 per cent of cases the ulcer never heals, or reappears, or a gastrojejunal ulcer forms; in another 5 per cent a big hæmorrhage occurs; and in others there are errors of gastric motility causing vomiting, nausea, discomfort, etc. R. Lewisohn,[9] J. B. Deaver,[10] and D. Chamberlain[11] all declare themselves in favour of **Partial Gastrectomy** for gastric ulcer. Lewisohn maintains that they have reduced the poor results after operating for duodenal ulcer from 50 per cent to 5 per cent in his clinic in New York. These figures take note of those patients who complain only of very trivial discomforts. They therefore perform partial gastrectomy for duodenal ulcer as a routine. He denies that the mortality of the gastrectomy is larger than that of the anastomosis operation. Deaver advises the cautery operation together with gastro-enterostomy for duodenal ulcer on the anterior wall, and either duodenectomy or simple gastro-enterostomy for posterior-wall ulcers. Chamberlain says that at Leeds 9·5 per cent of neglected gastric ulcers are cancerous, and the mortality of partial gastrectomy is 8 per cent, so that it is life-saving.

Technique.—A. Winkelbauer[12] advocates anastomosis of the stump of the stomach to the duodenum in the Billroth I operation by an end-to-side union *below* the ampulla of Vater. A. de Petz,[13] and also J. Loessl,[14] both of Hungary,

PLATE XXVIII

DE PETZ SEWING CLAMP

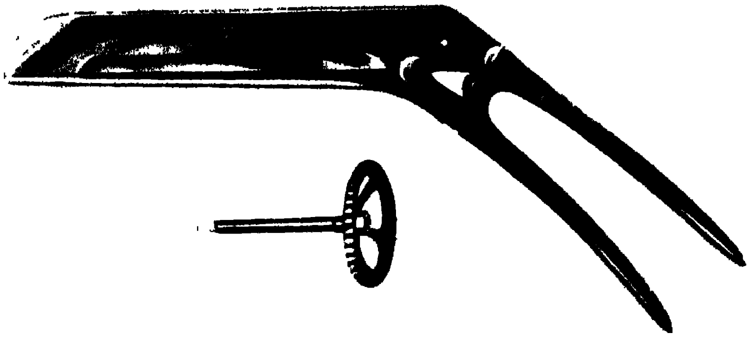


Fig. A. Stitching forceps and removable handle.

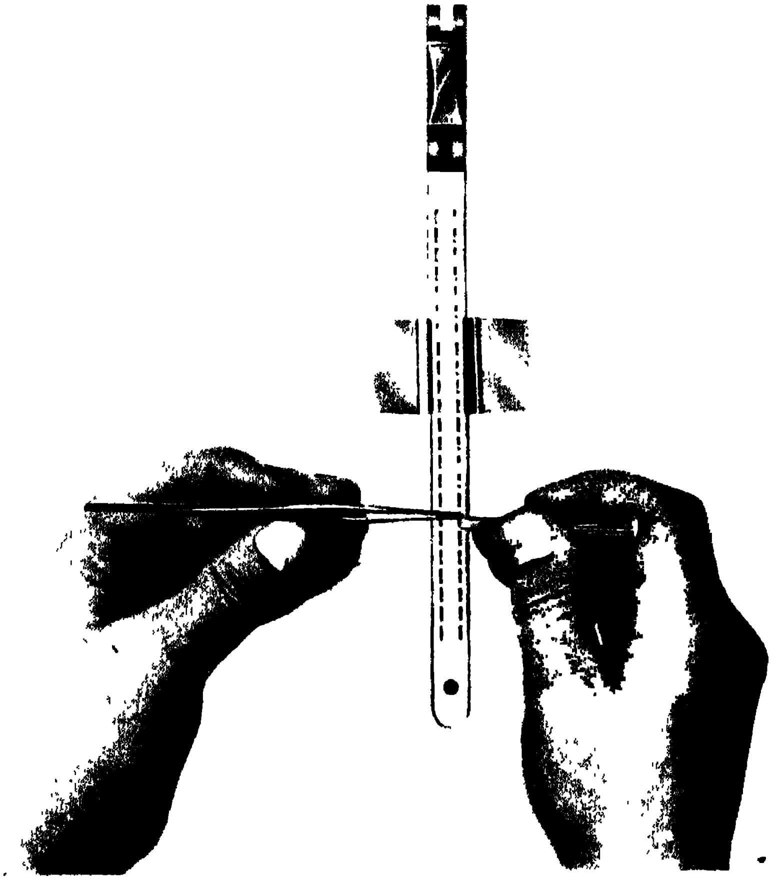
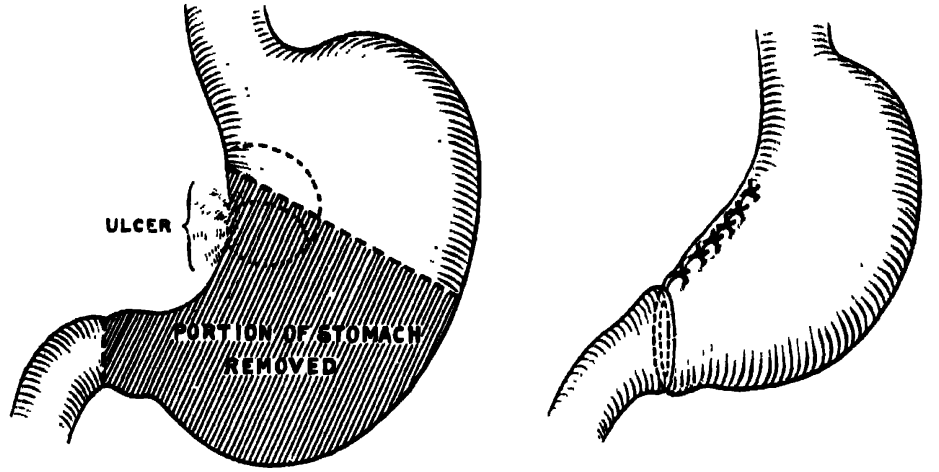


Fig. B.—Filling up the stitching forceps. The removable upper part is placed at the container and the fine U-shaped new-silver hooks are pushed one after another in the holes of the clamp by means of a pincett and filling pin.

By kind permission of 'Annals of Surgery' describe a new de Petz sewing clamp, used for the Billroth II resection of the stomach (*Plate XXVIII*). This instrument inserts a row of U-shaped silver hook-stitches, which take the place of the inner suture-line, in about ten seconds. They are covered in by an ordinary suture through the seromuscular coats, and work their way into the cavity of the stomach later, and are passed per rectum. Another variety of sewing-machine, Hueltl's, is described favourably by E. Neuber.[15] C. A. Roeder[16] has an operation for duodenal ulcer in which he mobilizes the duodenum, amputates the first part, and closes it, then performs an end-to-side anastomosis of the pylorus to the second part of the duodenum. In a short series of cases good results are claimed. V. Pauchet[17] discusses the treatment of high-placed gastric ulcers, on the lesser curvature close up to the œsophagus. He resects the greater part of the stomach and also the ulcer, and then sutures along the upper part of the stomach that remains so as to form a new lesser curvature, until the opening is just large enough to fit comfortably to the end of the duodenum as in the Billroth I operation (*Figs*. 15, 16). N. N. Nazaroff,[18] of Saratov in Russia, reports 32 successful cases of cholecystogastrostomy for gastric ulcer. It has been used in Russia for five years, since it was introduced by Bogoraz in 1923. It should not be done if the induration suggests malignant disease.



Figs. 15, 16.—Pauchet's operation for excision of high-placed gastric ulcer, showing the stomach before and after operation. (*Re-drawn from 'La Presse médicale'.*)

Statistical End-results.—F. J. S. Heaney[19] reports the end-results of 65 cases of duodenal ulcer treated by gastrojejunostomy: Good end-results, 24; Good but under 1 year, 29; Unsatisfactory, 6 (2 were gastrojejunal ulcer); Untraced, 4; Died in hospital, 2. Also 84 cases of gastric ulcer, divided into 54 uncomplicated and 30 complicated cases. Of the uncomplicated cases (treated by gastrojejunostomy): Died in hospital, 2; Untraced, 2; Good result, 50. Of the complicated cases (mostly treated by partial gastrectomy): Died, 5; Unsatisfactory, 3 (all treated by high gastro-enterostomy); Good result, 22.

A. J. Walton's[20] results are set out in *Tables I-III*, which show an analysis of late results (1928) of cases operated upon in 1920-24 inclusive. It will be observed that gastro-enterostomy for duodenal or pyloric ulcer has a mortality of 2·3 per cent in 172 cases, and that 84·9 per cent of the cases traced gave a good result. Ulcer of the lesser curvature treated by wedge resection and gastro-enterostomy shows in 67 cases a mortality of 2·9 per cent and 92 per cent of good results (if untraced cases are excluded), whereas of 87 in which partial gastrectomy was done 4 died and 74 per cent were satisfactory.

Table I.—LATE RESULTS IN PYLORIC AND DUODENAL ULCERS.—*A. J. Walton.*

OPERATION	TOTAL	M.	F.	DIED	POST-OPERATIVE HÆMORRHAGE		GASTRO-JEJUNAL ULCER	POST-OPERATIVE OBSTRUCTION	CARCINOMA	RECURRENT ULCER	WELL		PER-CENTAGE WITHOUT LOST CASES	NOT WELL	DIED LATER	LOST
					Died	Living					Number	Per cent				
A. *Posterior Gastro-enterostomy* :—																
Pyloric without stenosis ..	30	22	8	1	1	1	1	-	-	1	24}	86·5	90·6	1	1	1
Pyloric with stenosis ..	37	29	8	-	—	1		-	—	-	34}			1	1	2
Duodenal	105	96	9	3	—	1	5	1	—	-	88			5	2	4
	172	147	25	4	1	3	6 (3·4%)	1	-	1	146	84·9	88·4	7	4	7
B. *Anterior Gastro-enterostomy* :—																
Pyloric without stenosis ..	1	1	—	—	—	—	-	-	-	—	1	—	-	—	—	—
Pyloric with stenosis ..	—	—	—	—	—	—	-	-	—	—	—	-	-	—	—	—
Duodenal	1	1	—	—	—	—	-	-	—	-	1	—	-	—	—	—
	2	2	—	—	—	—	-	-	-	-	2	-	-	—	—	—
C. *Partial Gastrectomy* :—																
Pyloric without stenosis ..	1	1	—	—	—	—	—	-	-	-	1	—	-	-	—	-
Pyloric with stenosis ..	7	6	1	1	-	-	—	-	-	-	6	-	-	—	2	—
Duodenal	2	2	—	—	—	—	-	-	-	—	1	-	-	1	—	—
	10	9	1	1	—	—	—	—	—	-	8	—	—	1	2	—

Table II.—LATE RESULTS IN ADHERENT AND NON-ADHERENT LESSER CURVE ULCERS.—*A. J. Walton.*

OPERATION	TOTAL	M.	F.	DIED	POST-OPERATIVE HÆMORRHAGE		GASTRO-JEJUNAL ULCER	POST-OPERATIVE OBSTRUCTION	CARCINOMA	RECURRENT ULCER	WELL		PER-CENTAGE WITHOUT LOST CASES	NOT WELL	DIED LATER	LOST
					Died	Living					Number	Per cent				
A. *Wedge Resection and Gastro-enterostomy :*—																
Adherent	30	25	5	1			1				26			1	2	
Non-adherent ..	37	26	11	1						1	33			2·1	1	
	67	51	16	2			1			1	59	88	92·18	4	3	
B. *Cautery Excision and Gastro-enterostomy :*—																
Non-adherent	1	1	—	—										1		—
C. *Partial Gastrectomy* —																
Adherent	18	16	2	1							13			1	3·1	2
Non-adherent ..	19	14	5	3							13			3	1	
	37	30	7	4							26	70·27	74·28	4	5	2
D. *Gastro-enterostomy* —																
Adherent	3	3	—	2	1						1					
Non-adherent ..	5	4	1							1	3					
	8	7	1	2	1	—				1	4					

Table III.—LATE RESULTS IN HOUR-GLASS STOMACH.—*A. J. Walton.*

OPERATION	TOTAL	M.	F.	DIED	POST-OPERATIVE HÆMORRHAGE: Died	POST-OPERATIVE HÆMORRHAGE: Living	GASTRO-JEJUNAL ULCER	POST-OPERATIVE OBSTRUCTION	CARCINOMA	RECURRENT ULCER	WELL: Number	WELL: Per cent	PER-CENTAGE WITHOUT LOST CASES	NOT WELL	DIED LATER	LOST
Wedge Resection and Gastro-enterostomy	6	1	5	1		—					4			1	1	
Partial Gastrectomy	14	—	14	1	1	—					12			1	—	

L. R. Broster[21] reports a series from Charing Cross Hospital. The death-rates in 207 cases were: Duodenal ulcer 14, or 6·7 per cent; gastric ulcer 6, or 8·0 per cent; pyloric ulcer 4, or 8·8 per cent; total 6·7 per cent. The end-results are classified as follows (*very good* means perfect; *good* means merely a distaste for one or two items of food):—

TYPE OF ULCER	NO. OF CASES	VERY GOOD	GOOD	VERY FAIR	FAIR	POOR
		Per cent	Per cent	Per cent	Per cent	Per cent
Duodenal	58	30	44	8·6	8·6	8·6
Gastric	39	28	54	12·5	2·5	2·5
Pyloric . ..	24	33	41·7	7·9	12·5	4·0
Total	121	30	47	10	7·8	5

OPERATION	VERY GOOD	GOOD	VERY FAIR	FAIR	POOR
Partial gastrectomy	3	9	1	1	1
Excision with posterior gastro-enterostomy	3	-	2*	1	1
Sleeve resection	3			-	-
Posterior gastro-enterostomy -					
For gastric and pyloric ulcer . ..	13	18	-	4	
For duodenal ulcer	15	25†	5*	3	4
Total (112 cases)	37	52	8	9	6
Percentage	33	46·4	7	8	5

* One with gall-stones. † Two with gall-stones.

E. S. Judd and G. W. Nagel[22] give the results of excision of duodenal ulcer at the Mayo Clinic. The operation is performed in those patients in whom hæmorrhage is a prominent symptom, or when the patient is young and the history is short. It is not indicated if the duodenum is firmly adherent. At first the pyloric sphincter was not disturbed, but the ulcer was cut out. In a second series the sphincter was cut but not removed. In a third the results were improved by excising the ulcer and also removing the front of the pyloric sphincter. The steps of the operation can be followed in ***Fig.* 17, *a, b, c, d, e, f,*** and ***Fig.* 18**. In the *first* series of 140 cases, 2 died after operation, and 2 later. Results in 108 followed up: Cured, 62 (57 per cent); greatly benefited, 11 (10 per cent); benefited, 14 (13 per cent); failure, 21 (19 per cent). The *second* series (48 cases) showed much the same. In the *third* series (85 cases), 1 died after operation, and 1 later. Results in 58 patients followed up: Cured, 35 (60 per cent); greatly benefited, 9 (16 per cent); benefited, 9 (16 per cent); failure, 4 (7 per cent). They consider that the results when the sphincter is excised as well as the ulcer are better than those of gastro-enterostomy, and there is no fear of gastrojejunal ulcer.

M. Friedemann[23] contributes a statistical study of his cases of gastric and duodenal ulcer treated by the Billroth I and II methods:—

	AFTER BILLROTH I (221 CASES)		AFTER BILLROTH II (153 CASES)	
Very good ..	85 =	38·5 per cent	53 =	34·7 per cent
Good .. .	88 =	39·8 ,,	69	45·1 ,,
Fair . ..	38	17·2 ,,	23	15·0 ,,
Poor	10	4·5 ,,	8 =	5·2 ,,

It will be observed that after each operation about 80 per cent are regarded as satisfactory and 5 per cent as failures, and that there is but little to choose between the two methods. The patients were followed from three to six years.

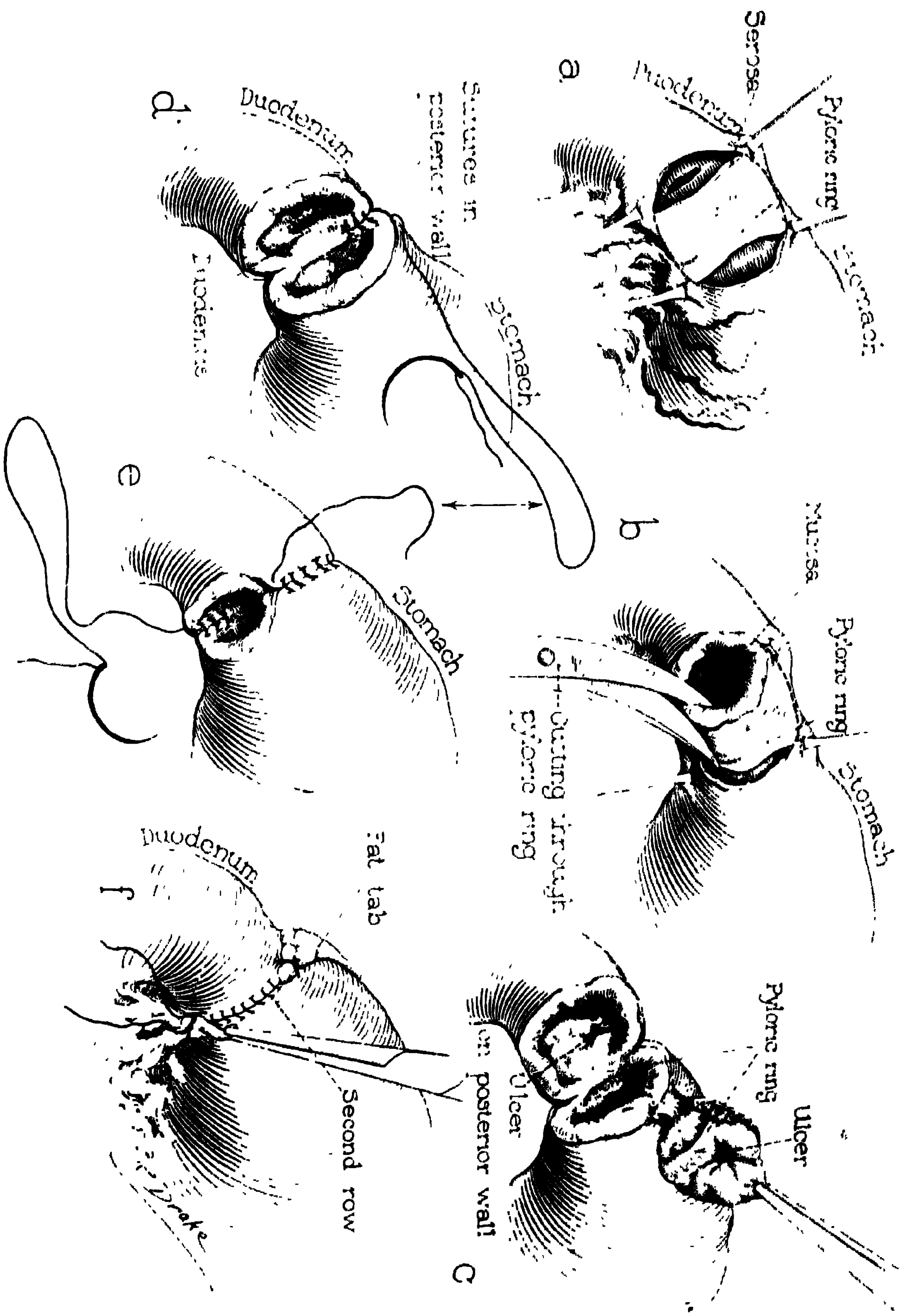


Fig. 17.—Excision of duodenal ulcer, partial resection or pyloric sphincter and gastro-duodenostomy.

D. C. Balfour[14] makes a study of the results of operation for duodenal ulcer in 100 doctors! Nearly all were treated by gastro-enterostomy, and in 95 per cent the result was a success, in 90 a complete success. Five were failures. The few cases treated by excision were not so good.

Failures after Gastrojejunostomy.– A. Rendle Short[25] describes a form of vomiting coming on immediately after the operation, due to adhesion of the anterior and posterior suture lines. He has seen several cases. The patient vomits everything, but it differs from the vicious circle in that no bile is present. If a second operation is performed the stomach is found tightly distended, and the adhesion can be broken down by the finger. To prevent this trouble, and incidentally to ensure a good 'lie', he inserts a small strip of corrugated rubber dam, secured by a catgut thread, in the opening leading from the stomach to the efferent loop. The adoption of this simple device has practically banished difficulty with post-operative vomiting, immediate or remote.

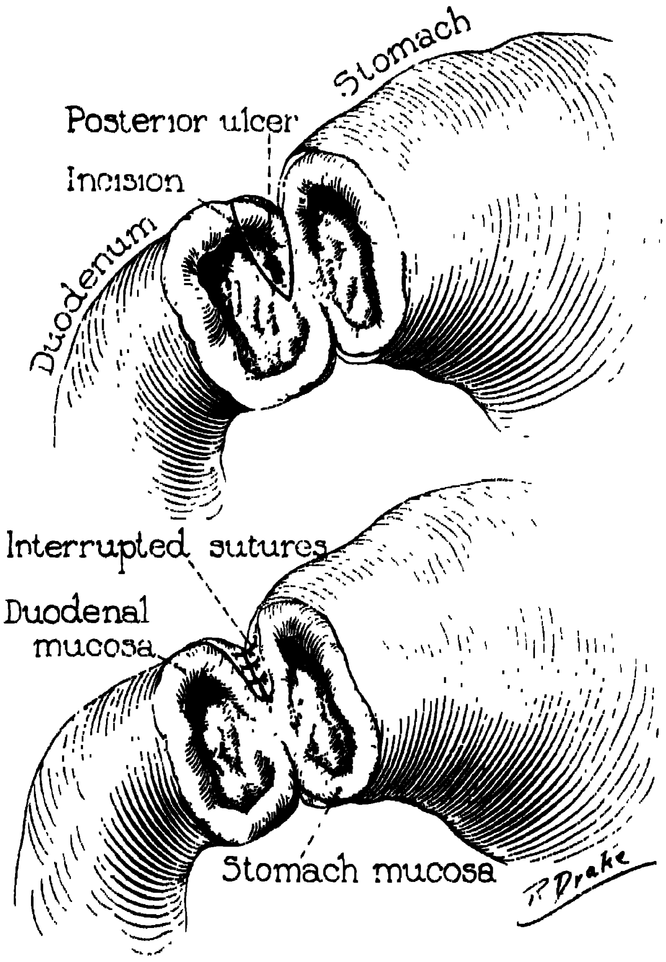


Fig. 18. –Excision of posterior ulcer.
(*Figs.* 17, 18 *by kind permission of ' Surgery, Gynecology and Obstetrics '.*)

Evans Jones[26] reports on 55 cases of unsuccessful gastro-enterostomy from Hurst's New Lodge Clinic. The ill success is attributed in part to the fact that few if any had had adequate medical treatment either before or after the operation. In 36 cases the recurrent trouble was due to gastrojejunal ulcer, in 4 to persistent gastric or duodenal ulcer, and in 15 to an assortment of ill effects such as flatulence, vomiting, or diarrhœa, due to a badly placed stoma in 1 case, bands obstructing the anastomosis in 2, neurosis in 4, cholecystitis or appendicitis in 4, and achlorhydric diarrhœa or other intestinal dyspepsia in 6. The cases are fully reported and worked out in detail. In the last 15 cases, 9 were relieved by medical treatment such as lying on the right side for an hour after each meal, prescribing small dry meals, and pancreatin. In 6 some operation was done.

A report from Russia is given by Scholkow and Iljin.[27] Between 1914 and 1926 gastro-enterostomy was performed on 1022 patients with gastric or duodenal ulcer, with an immediate mortality of 3 per cent. Almost all were done under local anæsthesia. Vicious circle followed in 5 cases. Of 580 cases traced for not less than three years, 71 per cent had a good result, with slight or no trouble, and 9 per cent were not satisfactory. Eight cases died later of cancer of the stomach, 37 died of other stomach ailments such as perforation, bleeding, or recurrent ulcer. In 15 patients a second operation was performed.

Gastrojejunal Ulcer.—This subject was somewhat fully discussed in the MEDICAL ANNUAL for 1927. Evans Jones[26] says that of the 36 cases treated at New Lodge, 26 were treated medically, and in 10 an operation was performed. The medical treatment was exactly that used in the clinic for gastric ulcer; half were greatly relieved, 8 still got some bleeding at times. The operation performed was excision of the ulcer and undoing of the gastro-enterostomy, which gave good results. R. P. Rowlands[28] writes to the same effect, emphasizing the importance of removing all sources of sepsis in the mouth, etc. Partial gastrectomy should be reserved for complicated cases. Making another gastrojejunostomy is useless.

A. A. Strauss, L. Bloch, and J. G. Friedman,[29] of Chicago, advocate **Gastric Resection** by the Polya technique, and report 18 successes. F. H. Lahey and S. M. Jordan[30] agree, unless the procedure would prove very difficult. G. Nyström and F. Söderberg[31] point out that gastrojejunal ulcer has in 62 recorded cases followed even a resection of the stomach, and that free HCl is not absolutely necessary for its formation. It was not nearly as frequent, however, after the Billroth II resection as after a simple gastro-enterostomy.

Gastrojejunocolic Fistula.—Quite a number were recorded during 1928. The symptoms are diarrhœa, which may include articles recently taken as food passing unaltered, fæcal vomiting, with colic and loss of weight, but pain is not severe. It is very fatal. According to Lahey and Jordan, excision of the gastro-enterostomy and of the ulcer, with closure of the fistulous track, gives the best results. Brock[32] points out that all the recorded cases are in males. He reports 9 cases, all of which were cured by an operation similar to that advocated above. I. MacDonald[33] also reports six successful cases, and gives a good account of the method of operating. In some he operated as above, but in others he added a new gastrojejunostomy.

Bleeding Gastric or Duodenal Ulcers.—C. A. Pannett[3] believes that these patients die of hæmorrhage more often than is supposed, and maintains that the surgeon should be more ready to operate after a blood transfusion, in spite of the admitted risk. D. C. Balfour,[34] of Rochester, Minnesota, on the other hand, holds the generally accepted opinion that death from a single massive hæmorrhage is rare, and that immediate operation is inadvisable. If bleeding recurs, operation after transfusion should be performed as an emergency procedure. If the ulcer is duodenal, it should be excised if anterior; even if posterior it may be possible to reach it with the cautery, or at least to tie the bleeding arteries. [In our experience, the intramuscular or intravenous injection of 15 c.c. of 30 per cent **Sodium Citrate,** recommended in the MEDICAL ANNUAL for 1924, p. 196, is often effectual in checking continuing bleeding.—A. R. S.]

Perforated Gastric or Duodenal Ulcer.—A good, full account of this catastrophe and of the differential diagnosis and treatment, from the graphic pen of Sir Berkeley Moynihan,[35] may be read with profit. He advises a gastro-enterostomy at the time for large holes in the duodenum with stenosis. The mortality-rate at Leeds for the years 1920–25 is given as follows :—

TYPE OF ULCER	UNDER 12 HOURS	12-24 HOURS	OVER 24 HOURS	TOTAL
	Per cent	Per cent	Per cent	Per cent
Perforated gastric ulcer ..	18·18	50	100	26·9
,, duodenal ulcer .	15·43	50	88·8	23·1

R. Lewisohn[36] considers the after-history of such cases. He finds that of 33 patients who were re-examined, 20 had remained quite well, and 13 were still in trouble, although 2 of them had had a gastro-enterostomy. He is inclined to advocate gastric resection when the perforation is quite recent and the patient still in good condition, but he admits that the procedure would carry a risk.

REFERENCES.—[1]*Ann. of Surg.* 1928, March, 401 ; [2]*Lancet*, 1927, ii, 1228 ; [3]*Brit. Med. Jour.* 1928, i, 623 ; [4]*Arch. f. klin. Chir.* 1927, cxlvii, 576 ; [5]*Arch. ital. di Chir.* 1927, xvii, 1 ; [6]*Bull. et Mém. Soc. nat. de Chir.* 1927, Oct. 22, 1097 ; [7]*Med. Press and Circ.* 1927, Nov., 385 ; [8]*Med. Jour. Australia, Supp.* 1927, Sept. 17, 167 ; [9]*Jour. Amer. Med. Assoc.* 1927, ii, 1649 ; [10]*Surg. Gynecol. and Obst.* 1928, Feb., 161 ; [11]*Ibid.* 1927, Oct., 512 ; [12]*Zentralb. f. Chir.* 1927, Nov. 19, 2946 ; [13]*Ann. of Surg.* 1927, Sept., 388 ; [14]*Ibid.* 1928, Jan., 80 ; [15]*Surg. Gynecol. and Obst.* 1927, Aug., 204 ; [16]*Ibid.* 1928, May, 714 ; [17]*Presse méd.* 1928, March, 401 ; [18]*Surg. Gynecol. and Obst.* 1927, Oct., 474 ; [19]*Brit. Med. Jour.* 1928, i, 1055 ; [20]*Ibid.* 1928, ii, 784 ; [21]*Ibid.* 786 ; [22]*Surg. Gynecol. and Obst.* 1927, July, 17 ; [23]*Zentralb. f. Chir.* 1927, Nov. 26, 3015 ; [24]*Ann. of Surg.* 1927, Nov., 691 ; [25]*Brit. Med. Jour.* 1927, ii, 1135 ; [26]*Guy's Hosp. Rep.* 1928, April, 158 ; [27]*Nouv. chir. Archiv.* 1927, No. 51, 368 ; [28]*Brit. Med. Jour.* 1928, i, 433 ; [29]*Jour. Amer. Med. Assoc.* 1928, i, 181 ; [30]*Ann. of Surg.* 1928, Feb., 231 ; [31]*Zentralb. f. Chir.* 1928, Feb. 4, 258 ; [32]*Guy's Hosp. Rep.* 1928, April, 178 ; [33]*Lancet*, 1927, ii, 801 ; [34]*Jour. Amer. Med. Assoc.* 1927, ii, 1656 ; [35]*Practitioner*, 1928, March, 137 ; [36]*Ann. of Surg.* 1928, June, 855.

GENERAL PARALYSIS. (*See* DEMENTIA PARALYTICA.)

GLANDULAR FEVER.

J. D. Rolleston, M.D.

SYMPTOMS AND COMPLICATIONS.—J. Comby[1] regards glandular fever as a benign streptococcal infection of the throat involving the glands at the angles of the jaw. He states that the initial sore throat may be absent or escape notice, but there does not appear to be any other portal of infection. P. Chevalier,[2] most of whose cases occurred in adults while Comby's were in children, considers the term 'glandular fever' as undesirable for three reasons : (1) Many writers have wrongly applied it to the adenitis following recurrent attacks of inflammation of the nasopharyngeal adenoid tissue. (2) It is not certain that all the diseases characterized by fever and transient adenopathy should be placed in the group of Pfeiffer's disease. (3) The identity of the glandular fever of children and the infective mononucleosis or monocytic angina of adults is still under discussion. Writers who, like Tidy and Morley (*see* MEDICAL ANNUAL, 1922, p. 188 ; 1924, p. 189) regard the two diseases as identical, have noted that mononucleosis is less intense in children and in epidemics than in adults and in sporadic cases. Chevalier differs from Comby in maintaining that suppuration in glandular fever is very rare and is generally due to secondary infection.

L. D. Cady,[3] who reports nine illustrative cases in adults aged from 20 to 56 encountered during a period of four years, states that since his attention has been directed to the blood-findings in glandular fever and its apparent identity with infective mononucleosis a rapidly increasing number of reports has been made of epidemics and sporadic cases which show that the disease is not uncommon. The diagnosis from leukæmia is most important. Glandular fever may be confused with syphilis, tuberculosis, and Hodgkin's disease. The patient may also have perplexing abdominal symptoms. The diagnosis cannot be made without repeated blood-counts and very careful differential counts. Sometimes the suspicion of leukæmia may persist even after such examinations.

REFERENCES.—[1]*Bull. et Mém. Soc. méd. Hôp. de Paris*, 1928, 906; [2]*Ibid* 1054, [3]*Amer. Jour. Med. Sci.* 1928, clxxv, 527.

GLAUCOMA.

Lt.-Col. A. E. J. Lister, I.M.S. (retd.).

ETIOLOGY AND PATHOGENESIS. Important work has been done in the past two years on this subject. It has been taken up by W. S. Duke-Elder[1] largely from the biochemical side. He has studied the reactions of the intra-ocular pressure to osmotic variations in the blood. The original paper must be consulted for details. The author concludes that cataract and glaucoma are caused by physicochemical derangements of the normal state of the eye. In a later paper[2] Duke-Elder discusses the etiology of glaucoma. After reviewing the evidence, he concludes that there are two main factors: first, a derangement of the capillary circulation, involving a capillary dilatation, which produces a rise in capillary pressure, or an increased permeability in their walls, allowing an excess of colloids in the fluids of the eye; secondly, changes of a physicochemical nature in the vitreous. Under certain conditions the vitreous *may increase in volume*. As the author states: "The general appearance of a typical glaucomatous eye, with the anterior chamber shallow and the iris and the lens pushed forward, strongly suggests that one of the commonest and most important changes which occur in this disease is an increase in the volume of the vitreous." The author says that attention has been focused too long on the pathological findings in eyes which had been excised for established glaucoma. The findings in these have almost invariably been interpreted as the essential causal factors in the disease, while it is more than possible that they may have been merely subsidiary causes or results.

The Proportion of Lipoids in the Blood of Glaucoma Patients and its Influence on the Ocular Tension.—G. Salvati[3] says that many authors think that the pathogeny of glaucoma is related to an alteration in the exchange of lipoids due to endocrine troubles, and more particularly to an excess of lipoids in the blood. These substances, which defend the organism, are capable in excess of provoking hypertension. The author has estimated the amount of cholesterin in 100 glaucoma patients, excluding secondary glaucoma, and finds the proportion of cholesterin markedly raised as compared with the normal, which is about 1 grm. per litre of serum. He also administered cholesterin to dogs for five months, which caused a real condition of hypertension. The eyeballs were afterwards histologically examined. The chief changes seen were obstruction of the filtration angle and sclerosis of the vessels of the iris, retina, and optic nerve. The author summarizes the changes by saying that they are almost identical with those produced by glaucoma in the human eye. He concludes that we cannot do less than think that excess of cholesterin in the blood is capable of producing hypertension, either by alteration of the ocular filtration or by lesions of the centres which preside over the endocular equilibrium.

TREATMENT.—Practitioners are specially interested in treatment. No one can say the operative treatment of glaucoma, though great advances have been made through the introduction of the various filtration operations, is at present satisfactory. The few extracts will afford food for thought to many, and point the way, let us hope, to a better line of treatment in the future. Meanwhile, it is interesting to note that the old operation of scleral puncture, which was taught the reviewer as a useful procedure some thirty-four years ago by his teacher, may possibly be explained in the light of this new knowledge as to swelling of the vitreous. It was claimed that it sometimes effected a permanent cure. In an acute case, due to swelling of the vitreous, if such be the case, its mode of action is now at least partially explained.

Treatment of Glaucoma with Glaucosan, Glaucosan Drops, and Amino-glaucosan Drops.—Those interested in glaucoma should read an article by C. Hamburger,[4] from which the following is culled. The author quotes cases to show how a nervous shock sometimes causes glaucoma. Two ladies, an elderly patient and her sister, consulted Professor Hertel, of Leipzig, who found glaucoma and advised an operation. While he was speaking he noticed that the companion fell ill with glaucoma. A similar observation is reported by Professor Hegner, of Lucerne. These and other cases led the author to study the influence of the nervous system in this connection, as leading to a relaxation of the blood-vessels. The therapeutic use of **Adrenalin,** suggested by the author, resulted. One great inconvenience of this method, however, was a troublesome increase of the blood-pressure, with a pulse up to 200 and collapse, after injection of adrenalin. The author found that, as a rule, "lævogyrate suprarenin" was used in medicine. He found that "dextrogyrate suprarenin" possessed all the good qualities of the other substance without any of the bad ones. Briefly, the author uses these compounds in combination, and also the compound mentioned above, in the treatment of glaucoma. He finds that in certain cases after their use, miotics, which had failed to reduce the tension, can now do so. [These compounds are now on the market, but they are in the experimental stage, and those who think of trying them must read the original article, in which reference to several other papers will also be found. E. Thomson[5] gives a number of extracts of recent papers on this subject which should also be consulted; space does not admit of quoting from them. The medical treatment of glaucoma being of great interest and importance, the reviewer submitted these abstracts to Mr. Duke-Elder, and asked him if he could kindly give him any further information on the subject. He writes as follows: "If Hamburger's claims for the drugs which he advocates in the treatment of glaucoma are substantiated by extended clinical experience, they should prove of great value. The two most useful are **Lævo-glaucosan,** which lowers the tension for some days but dilates the pupil, and **Amino-glaucosan** (histamine), which lowers the tension for a shorter time and contracts the pupil. Both are given as drops, and the former is recommended for chronic glaucoma, the latter for acute. While I have had no experience as yet of their effect clinically, I have found in laboratory animals that the latter is indeed a very strong miotic, so strong as to overcome the influence of atropine, when it is used in considerable doses. The reaction locally is, however, intense; and it is too early yet to give a considered opinion as to ultimate clinical value." The reviewer wishes to express his thanks to Mr. Duke-Elder for his communication.—A. E. J. L.]

P. F. Archanguelski,[6] after having used glaucosan according to the method of Hamburger in seven cases of glaucoma, arrives at the following conclusions: The action of glaucosan does not differ from that of adrenalin as regards its general reaction on the eyeball. Its action on the intra-ocular tension is not more lasting than that of the usual miotics, which are more easily applied and less painful than injections of glaucosan. The blood-pressure is not influenced by subcutaneous injections of glaucosan. The author thinks, however, that the use of glaucosan combined with miotics may be useful.

C. Hamburger[7] says that the strongest miotic known is the complicated amine called **Histamine.** In adequate concentrations it will contract, in seven to fifteen minutes, pupils which have recently been dilated with atropine or scopolamine. Even a 10 per cent solution may be used without danger, with proper precautions. The drug must absolutely not be used by injection. It should be preceded by **Holocaine**, twice instilled, and the patient should be warned that the eyelids and face may possibly show swelling for some hours and that there will be some burning. The drug has been put on the market by a German firm, under the name of **Amino-glaucosan.**

Lowering of Intra-ocular Tension by Intravenous Injection of Sodium Chloride.—W. S. Duke-Elder,[8] in a paper on "Osmotic Therapy in Glaucoma", first advocated the use of a hypertonic solution of **Sodium Chloride** injected intravenously to lower the tension in glaucoma. A 30 per cent solution is employed. A dose of 1 c.c. per kilo of body-weight (that is, an average adult dose of about 50 c.c.) is employed. The lowering of the tension is transitory, but its value is obvious, as it allows an operation to be performed under better conditions. Care should be taken to see that the patient is in a reasonably healthy condition as regards the heart, kidneys, etc., before injecting a large quantity of very concentrated salt solution. If the patient is very dilapidated, the author regards it as a contra-indication to the use of this measure. The paper should be read in full by anyone wishing to adopt the method. Its main outlines can only be indicated here. [In a personal communication, for which the reviewer wishes to express his thanks, Mr. Duke-Elder states that his further experience of this method of treatment merely confirms his previous impressions as to its value.—A. E. J. L.]

R. E. Wright,[9] of Madras, has used sodium chloride according to Duke-Elder's method in twenty cases of glaucoma, and gives an interesting account with many details of his research. He concludes that this method of treatment is a valuable means of lowering the intra-ocular tension, effective in the great majority of cases, and specially valuable as a pre-operative measure. H. A. Goslich[10] has also used sodium chloride injections with good results, and recommends its use before operation for glaucoma in certain cases.

P. K. Lambert and S. Silbert[11] have studied the effect on the normal tension of the intravenous injection of 300 c.c. of a 5 per cent solution of sodium chloride. The patients were receiving injections for the treatment of thrombo-angiitis obliterans, as a part of the treatment. They found that an average drop of 40 per cent took place in the normal tension.

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GLYCOSURIA. (*See* DIABETES AND GLYCOSURIA.)

GOITRE. (*See* THYROID.)

GONORRHŒA.

Col. L. W. Harrison, D.S.O.

R. D. Herrold and H. Culver,[1] working independently, have found it of advantage to use gelatin as the medium of local application of antiseptics in acute gonorrhœa. The antiseptic chiefly employed was **Acriflavine**, which was dissolved in a 10 to 15 per cent solution of gelatin to a strength of 1–400. This strength would be very irritating in watery solution, but the gelatin appears to counteract this effect. The mixture is solid at room temperature, and, after the day's supply has been prepared, it should be kept warm in vacuum flasks. Daily injections are given by the surgeon and supplemented by self-administered injections of a mild silver preparation. In uncomplicated cases the average time to cure was 3·2 weeks, and in complicated, 8·4 weeks. The complications and sequelæ are stated to have been fewer than in cases treated by other methods.

A method of local treatment which appears to be based on a more scientific foundation than most of those hitherto employed has been evolved by A. Kissmeyer[2] (Copenhagen). The author reviews the principles underlying the methods followed by the two great schools: that which relies on the frontal attack by remedies designed to penetrate the mucous membrane and destroy gonococci in its depths, and the drainage school which aims to wash gonococci from the deeper tissues by the outflow of lymph and cells. Kissmeyer criticizes severely the silver preparations employed by the former school, pointing out that the silver in them is not in a form which can have much effect on gonococci. In this connection he draws attention to the work of H. Haxthausen[3] (*see* MEDICAL ANNUAL, 1926, p. 212), who showed that silver preparations must become silver chloride or sodium silver chloride before acting, and that their efficacy depends on the ease with which they are converted to these compounds. In collaboration with the chemist Gad Andresen he has produced a silver preparation, argentum-nitricum-citricum, or '**Citragan**', which he claims has two effects: (1) By virtue of its pH reaction, an outpouring of lymph from the deeper tissues; and (2) A penetration of silver in stronger concentration than occurs with the preparations of silver hitherto employed. Citragan is supplied in three forms: (*a*) Solution which is ready for injection; (*b*) A more concentrated solution which is prepared for use by diluting 30 c.c. with 500 c.c. distilled water, for irrigation into the bladder; and (*c*) Styli or bougies for insertion into the urethra. The styli are intended to maintain the effect of the chemical; they contain no fat, which the author considers to be objectionable in a medicated bougie. The author gives results on a fairly large number of cases which show in males distinct advantages of this form of treatment over any of those commonly employed. [By the courtesy of Dr. Kissmeyer and the firm of chemists who manufacture it, the reviewer has been afforded an opportunity of testing citragan at St. Thomas's Hospital. The results have so far been promising, but it is not yet possible to form a definite opinion of the compound. It is certainly non-irritating, which is a great advantage over preparations hitherto employed either for penetrating effect or for, what appears to be much more important, the stimulation of exosmosis. L. W. H.]

The routine use of **Vaccines** in the treatment of gonorrhœa is shown by E. D'A. McCrea[4] to have reduced the incidence of complications in the cases under his care. In 140 cases in which no vaccines were used, complications of various kinds occurred in 40, or 30 per cent, while in 134 cases treated with vaccines as a matter of routine the complications were 24, or 18 per cent.

Tests of Cure.—J. Frist[5] criticizes the provision in the new German law for venereal disease for limiting to six months the time after an attack of gonorrhœa in which a person can be prosecuted for infecting another. He says that a latent case may infect others from one to two or even six years later, and recommends that, on discharge from treatment, every patient should receive an instruction sheet setting out the limitations of tests of cure and the possibility that gonorrhœa is still present, with an order to attend for periodical examination every three months for at least a year.

GONOCOCCAL EPIDIDYMITIS.

M. F. Campbell[6] has made a report on 3000 cases of gonococcal epididymitis which well deserves careful study in the original. He finds that the incidence of the complication in gonorrhœa is between 20 and 30 per cent, a figure which is far higher than any in the experience of treatment centres in this country, and suggests that contributory causes mentioned by the author "too forceful injections, the passage of instruments, vigorous prostatic massage, exposure to cold, sexual or alcoholic excess" are commoner in the district served by the author's clinic. In 11 cases the onset of discharge and of epididymitis occurred on the same day, and in 2 the complication preceded the discharge. The incidence is greatest between the second and fourth weeks. Over half the cases had previously suffered from gonorrhœa, and 248 of them had had epididymitis, practically always on the same side. The right side was affected in 1494 cases, the left in 1308, and both sides in 198. The author quotes Benzla, who studied the offspring of German soldiers after epididymitis, and found that 10·5 per cent of those who had had gonorrhœa without epididymitis were childless; 23·4 per cent with previous unilateral epididymitis; and 41·7 per cent with bilateral. For treatment the author recommends particularly a suspensory bandage which is a modification of the Alexander muslin suspensory. It is made of adhesive tape of the dimensions shown in *Fig.* 19. An important constituent of the support is a small roller bandage 2½ in. by 1 in. placed so that it fits high in the scroto-perineal angle,

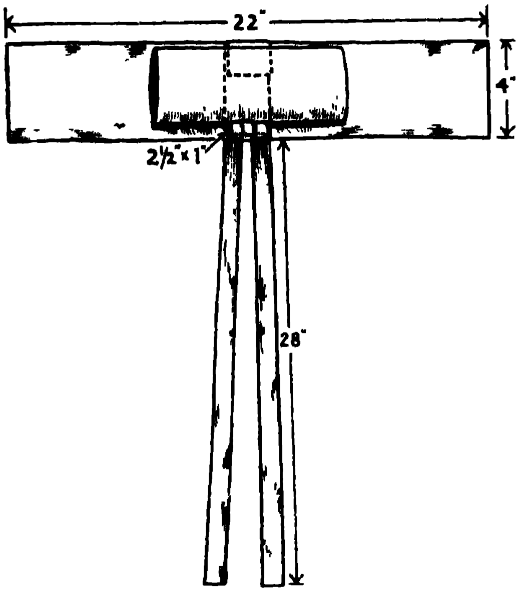

Fig. 19.—Construction of adhesive scrotal suspensory. Attention is directed to the position of the small perineal roller bandage.

(*Figs.* 19-21 *re-drawn from the 'Journal of the American Medical Association'.*)

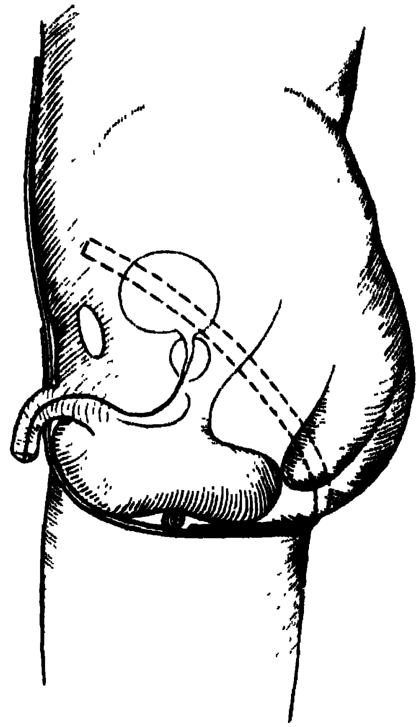

Fig. 20.—Application of small roller bandage high in scrotoperineal angle to prevent scrotal contents from slipping down into perineum.

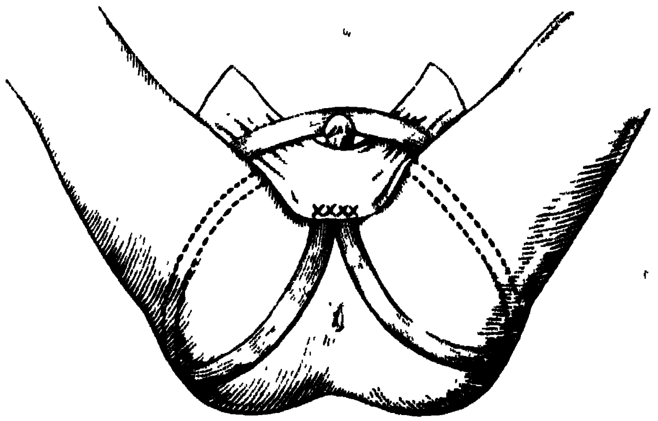

Fig. 21.—Perineal aspect of scrotal suspensory. Small crosses indicate position of roller bandage high in scrotoperineal angle.

thus supporting the scrotal contents and preventing these from slipping down. In application, as shown in *Figs.* 20, 21, the broad strapping passes under the scrotum and adheres to the abdominal wall in front, while each of the thin straps passes behind over the gluteal muscles to cross the outer third of the inguinal region in front. An additional suprapubic strap supports the others.

In cases where pain persisted and where there was gross suppuration, surgical procedures were adopted. The operation was epididymotomy in 178 cases, epididymectomy in 24, orchidectomy in 5, resection of vas in 1. In epididymotomy the open method of Hagner was adopted, the epididymis being exposed and punctured in several places with a Hagedorn needle. Where droplets of free pus exude, a small incision is made. After the operation a scrotal compression bandage is applied to prevent hæmorrhage into the scrotal tissues.

Treatment of Vesiculitis and Epididymitis by Injections of Arsenobenzene Compounds.—W. T. Belfield and H. C. Rolnick[7] produce evidence to the effect that "the epididymis, like other secreting glands, might, on occasion, excrete also". They injected intravenously into dogs various coloured chemicals, each of which gave its colour to the body of the epididymis, leaving the head uncoloured. Pyridium stained the heads of some of the sperms removed from the body and tail of the epididymis, and the emitted sperm of each of two men to whom pyridium had been given by mouth showed a distinct reddish tinge, while some of the sperm heads were also coloured. The authors claim thus to have demonstrated for the first time that the seminal ducts of the dog and of man excrete certain foreign substances introduced into the circulation. "An obvious corollary was the attempt to influence infections of the seminal duct, such as epididymitis and vesiculitis, by chemicals introduced into the blood". Thirty cases of vesiculitis and usually coincident prostatitis were treated on these lines. In 15 the urine became free from pus, the discharge from the meatus ceased, and subjective symptoms vanished usually after three to five intravenous injections of '914'. In 12 the treatment failed, and in 3 there was some improvement. The authors quote Lauterman (Montreal), who in 1924 recommended the use of sulfarsenol in the treatment of pus tubes in either sex, and, in a personal letter, states that this remedy has supplanted the knife in his treatment of gonorrhœal infections of the seminal duct, acute or chronic.

Autohæmotherapy has been found useful in gonorrhœal epididymitis by M. Scharman.[8] The patient's blood was removed from a vein at the bend of the elbow and injected at once. The first dose was 3 c.c., and injections were repeated every other day, the dose being increased by 1 c.c. each time to a maximum of 7 c.c. In cases of epididymitis of less than a week's duration, if the second injection is given two days after the first, it may provoke an increase of local symptoms, and the author therefore recommends that in such cases the interval between the first and second injections should be two days. In twenty-four cases of epididymitis the results are stated to have been good. The injections were well borne, and the patient was usually able to leave the hospital in ten days, an average of four injections sufficing for a cure.

GONOCOCCAL ARTHRITIS.

J. K. Mayr and B. Bremer[9] refer to the statement repeated in many textbooks that gonococcal arthritis is for the most part monarticular, and show by a statistical study of the cases of arthritis in their polyclinic during ten years that this view requires revision. In 5778 cases of gonorrhœa (males 2040, females 3738) the percentage with joint complication was 2·3 in men and 2·0 in women. Of these, 45·2 per cent were monarticular and 28·2 per cent polyarticular, while in 26·6 per cent the arthritis was first polyarticular and later monarticular, so that, generally speaking, the monarticular and the polyarticular were distributed evenly. In the 124 cases in question, 207 joints were affected in the following percentages: knee, 33·9; wrist, 20·4; ankle and foot, 19·3; shoulder, 9·6; elbow, 8·2. In the monarticular cases the knee was affected in 53·6 per cent of cases. [In a study of 11,149 cases of gonorrhœa (10,000 of them males) the reviewer found an incidence of arthritis, periarthritis, tenosynovitis, and bursitis of 3·47 per cent in males and 4·2 per cent in females. These rates are probably higher than would be found if an unselected sample of gonorrhœal cases were to be examined, as naturally a higher proportion of complicated than of uncomplicated cases would resort to a treatment centre. The order of incidence in respect of joints and, or contiguous structures affected can be judged from the following list: –

	Male	Female
Knees	172	17
Ankles	143	14
Feet and heels	87	1
Wrists	45	13
Hands and fingers ..	45	5
Shoulders	44	6
Elbows .. .	18	9
Hips	17	---
Sternoclavicular ..	1	1
Metatarsal ..		1

The proportion of cases with only one joint affected was approximately one-third.—L. W. H.]

B. A. Thomas[10] quotes Surgeon-Gen. Ireland, U.S. Army, to the effect that the incidence of arthritis in 259,899 admissions for gonorrhœa was 3·03 per cent. In his own experience the complication was polyarticular in 58 per cent of cases, and the joints involved in order of percentages were knee, 58; ankle, 50; hip, 32; wrist, 21; shoulder, 19; phalangeal, 17; elbow, 13; metatarso-phalangeal, 8; spine, 8; metacarpophalangeal, 7; sacro-iliac, 1; temporo-maxillary, 1; sternoclavicular, 1. He is inclined to believe that many cases of arthritis developing months or years after the acute gonorrhœa will be found to have at least a mixed or superimposed pyogenic focus of infection in the seminal vesicles, prostate, or tubes. In a statistical correlation of modes of treatment with results he shows the value of associating **Local Treatment** of the deep urethra and adnexa with **Vaccines** and with **Intravenous Therapy.** For the last he seems to use either **Antigonococcal Serum** in ascending doses every other day or **Ortho-iodo-oxybenzoic Acid** twice weekly for two to four weeks. If pain is severe, 4 c.c. of a 25 per cent solution of **Sodium Salicylate** and 15 to 30 gr. **Sodium Iodide** [presumably by the intravenous route] "will often exert a miraculous effect". In the discussion following this paper, Kovacs mentioned the value of **Diathermy** applied to the prostate and vesicles, as recommended by Cumberbatch. This speaker also referred to opening the joint in order to apply diathermy to it. [Such a procedure seems to the reviewer to be unnecessarily severe. Local treatment, especially diathermy of the prostate and vesicles, in conjunction with gonococcal vaccines and intravenous therapy, employing electrargol or antityphoid vaccine, and perhaps sodium salicylate or sodium iodide, seem sufficient in most cases to bring about a satisfactory result in a reasonable time. At the same time it is very important to attend to the general condition of the patient, and particularly to see that his excretory apparatus is working well. The patient's statement that his bowels are acting is a very fallacious guide, and in the reviewer's hands a change for the better has often been secured by steps designed to ensure that yesterday's remnants of food are evacuated by the bowel daily. In the same connection a liberal supply of water is important.—L. W. H.]

GONORRHŒA IN WOMEN.

R. S. S. Statham[11] recommends daily treatment as follows: With the patient on a gynæcological chair, the vagina is washed out with a weak solution of boric acid, and a fenestrated Cusco's speculum as large as can be tolerated is passed, and the vagina and fornices are fully stretched. All mucopus is cleared away with boric lotion, and a swab soaked in 1 per cent **Mercurochrome** is rubbed over the cervix and vagina so that the solution reaches every part, including the orifice of the cervical canal. A small quantity of the solution is run into the bladder, where it is retained for a few minutes. If the case seems to be resistant to mercurochrome, **Acriflavine,** 1–1000, is substituted for a week. The author claims advantages for this form of treatment over a modification of the St. Thomas's Hospital routine (*see* MEDICAL ANNUAL, 1928, p. 196), which had been employed in his centre previously. [The method has been tried in the V.D. Department at St. Thomas's Hospital, but in acute cases the results do not seem, so far, to have been so successful as those obtained by the author.—L. W. H.]

In *chronic gonorrhœa* in females A. Loeser[12] claims considerable success from subcutaneous injection of **Live Gonococci.** A newly isolated, 24- to 48-hour-old culture is washed off the medium with 3 c.c. physiological saline, and 0·5 to 1 c.c. injected. In 118 cases it is stated that 68 were cured with a single injection each, complete disappearance of gonococci occurring in from eight to fourteen days after the injection. In 5 other cases two or three injections were necessary. All the cases had been treated previously by other methods, including vaccines, without success.

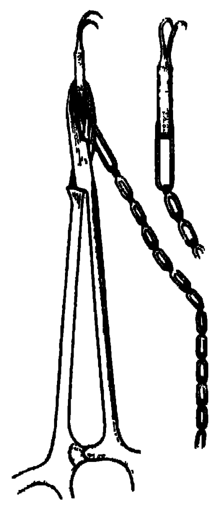

Fig. 22.—Hooks used for making traction on the cervix. These will not tear out, and the view of the part is not obstructed by handles. The cervix is steadied by volsella and a hook is placed in each lateral lip. Any standard needle holder may be used in inserting the hook; after insertion the needle holder is removed and traction is made by chain.

L. E. Burch[13] thinks that in cases of *salpingitis* too little attention is paid to the cervix, urethra, Skene's tubules, and Bartholin glands. In gonorrhœa in the female, symptoms of disease in these parts are often so mild that the patient is unaware of her condition. When a salpingitis occurs the patient seeks advice, and often the tubes are removed. This relieves the symptoms, and the patient is often then considered to be cured, though specimens from the cervix or urethra would usually be positive. The author thinks removal of tubes is too great a price to pay for relief of symptoms, having been impressed "by the almost miraculous way in which nature handled pelvic inflammation". He says: "I have had several cases showing a large pelvic abscess in which I subsequently operated for other conditions and found that the organs were practically normal. Patients for whom operation had been advised and refused, later conceived through the same tubes that I had wanted to remove". He determined to adopt a conservative treatment by **Local Applications** and **Protein Therapy.** For the last he gives 5 c.c. fat-free milk in the gluteal muscles the 1st day; 7 c.c. the 3rd day; 10 c.c. the 6th, and 10 c.c. every third day thereafter. He describes in detail his operation for making more accessible the mucous membrane of the cervical canal (*see* MEDICAL ANNUAL, 1928, p. 195). After sagittal incision of the cervix to the internal os with a thermocautery and application of the antiseptic pack, the patient is douched for twenty minutes every day, and the pack is replaced every other to every third day (*Figs.* 22–26).

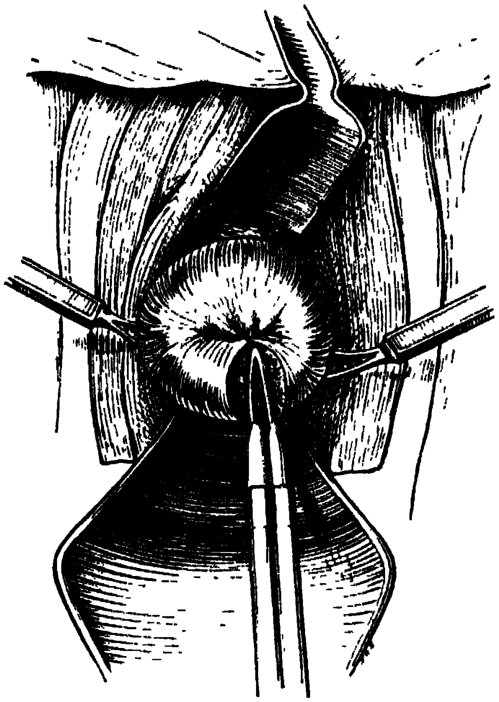

Fig. 23.—Cervix exposed and drawn to the vaginal outlet; soft parts are protected from burn by wet sponges. The posterior lip of the cervix is being incised with the cautery in its centre down to the internal os.

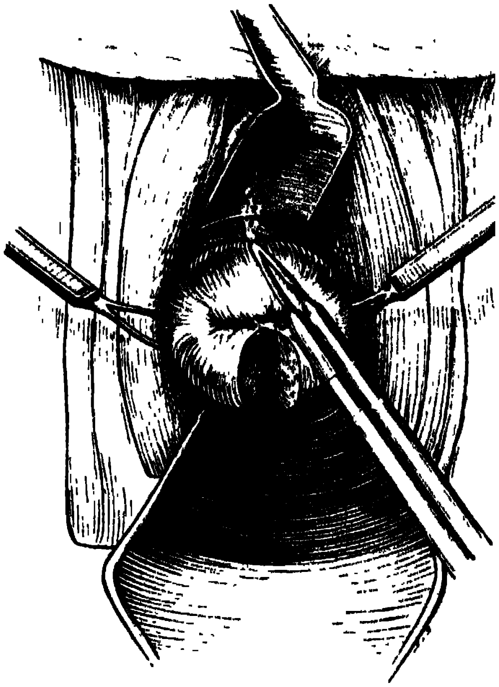

Fig. 24.—Incision of anterior lip in median line.

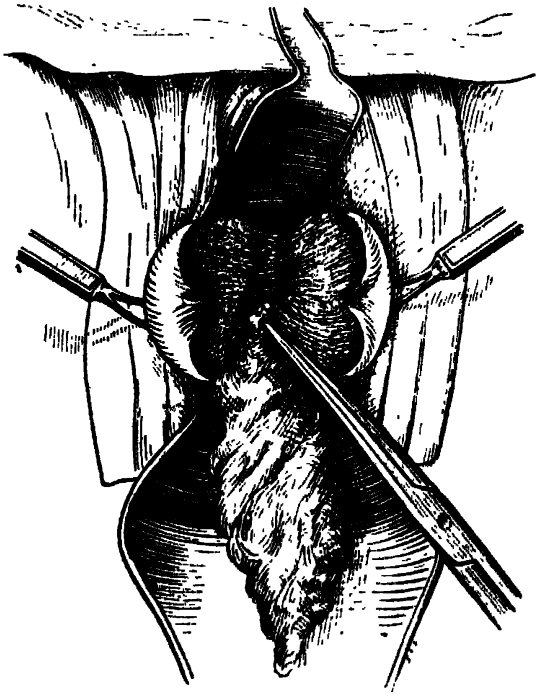

Fig. 25.—Germicide on gauze applied to cavity of cervix after incision.

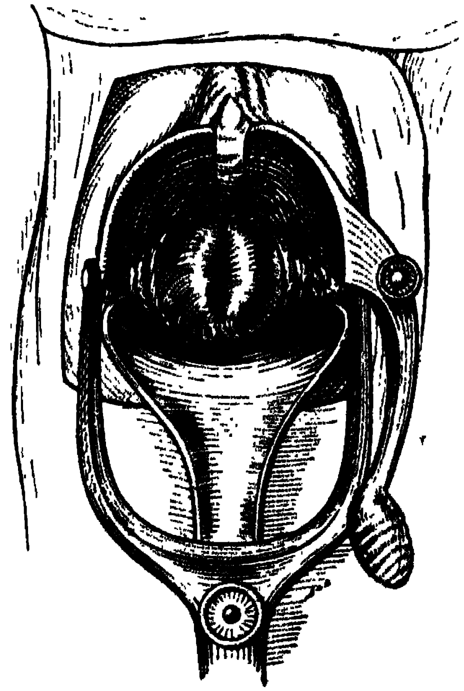

Fig. 26.—Healed cervix after operation.

(*Figs.* 22–26 *re-drawn from the 'Journal of the American Medical Association.'*)

F. Pinkus,[14] who was responsible for the medical examination of prostitutes registered in Berlin, is pessimistic as to the practicability of ever giving a woman who has acquired gonorrhœa a clean bill of health. He mentions a case in which ovaries, tubes, and corpus uteri were removed, leaving only the portio vaginalis; yet in the secretions from this stump gonococci were repeatedly demonstrated until senile involution occurred. Tests for cure are often negative for months though the disease is still present, so that one can never confidently say that the infection has gone. For this reason he recommends prostitutes to wear a capsule of celluloid or metal which adheres to the portio vaginalis quite firmly and prevents its secretions from reaching the vagina during coitus. The woman washes out her urethra daily and takes a vaginal douche before coitus so as to remove any secretion which may have reached the vagina over the edge of the protective capsule.

GONORRHŒAL VULVOVAGINITIS IN CHILDREN.

A long article by D. Lees[15] details the multitude of forms of treatment employed by different workers and illustrates the intractability of this disease. The paper should be consulted in the original as a sound exposition of present-day knowledge of the subject. In the centres under his own supervision, where a careful treatment based on experience of most of those recommended in the literature is carried out, the average duration of treatment and tests of cure in completed gonococcal cases have been seven months.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* 1927, Feb, 12, 459; [2]*British Jour. Ven. Dis.* 1928, July, 190; [3]*Med. Annual*, 1926, 212; [4]*Brit. Med. Jour.* 1928, i, 755; [5]*Wien. klin. Woch.* 1928, xli, 380; [6]*Ann. of Surg.* 1927, Oct., 577, also *Jour. Amer. Med. Assoc.* 1927, Dec. 17, 2108; [7]*Jour. Amer. Med. Assoc.* 1927, Dec. 17, 2105; [8]*Wien. klin. Woch.* 1927, Nov. 3, 1384; [9]*Münch. med. Woch.* 1928, June 15, 1024; [10]*Jour. Amer. Med. Assoc.* 1927, Dec. 24, 2174; [11]*Brit. Med. Jour.* 1928, i. 544; [12]*Amer. Jour. Obst. and Gynecol.* 1927, Sept., 329 (abstr. *Jour. Amer. Med. Assoc.* 1927, Nov. 19, 1810); [13]*Jour. Amer. Med. Assoc.* 1928, Jan. 21, 166; [14]*Med. Klinik*, 1927, Dec. 9, 1888; [15]*Edin. Med. Jour.* 1928, May, 61.

HÆMATEMESIS.

Robert Hutchison, M.D., F.R.C.P.

It is commonly said that hæmatemesis, although an alarming symptom, is not often fatal. Ernest Bulmer[1] does not share this cheerful view. He has analysed the cases of severe hæmatemesis admitted to the General Hospital, Birmingham, in the last 25 years (526 in all), and finds that the mortality is much higher than is generally stated. In cases of hæmorrhage from acute ulcer it was 8·3 per cent, in chronic ulcers 11·6 per cent, and in cirrhosis of the liver about 30 per cent; and out of 7 cases of cancer admitted for profuse hæmatemesis 6 died. He also found that the mortality from bleeding ulcers has risen in the last 8 years, and suggests that this may be due to the too free use of morphia.

TREATMENT.—Albert Andresen[2] suggests the following as the routine to be adopted in the treatment of any case of gastric hæmorrhage: (1) Keep the patient quiet by ordering sufficient morphine to prevent thirst. Bromide and chloral by rectum should also be tried. (2) Order gastric hæmorrhage diet (*see* table below). (3) Type blood of patient, get donors for transfusion, and match their bloods, so as to be in readiness for transfusion if indicated. (4) Blood transfusion is not to be given until after the first week, unless especially indicated by air hunger or a very weak, thready pulse. (5) Blood-count (red blood-cells and hæmoglobin) should be taken every two days. (6) Blood coagulation time and bleeding time should be determined every two or three days, especially before and after transfusion. (7) If the coagulability of the blood is shown to be low, give an intramuscular injection of heterologous blood

(from 10 to 20 c.c.) or order a hypodermic or intravenous dose of some systemic coagulant and repeat at least once, being careful to avoid anaphylaxis. (8) Make no efforts at moving bowels for three days. On fourth night order warm oil enema (5 oz. to be retained), with small soapsuds enema the next day if necessary. Continue oil enemas each night if necessary. (9) Test stools daily for occult blood until this disappears.

The following are to be avoided: (1) Ice or any other food or medication by mouth except as indicated in gastric hæmorrhage diet. (2) Sudden increasing of the blood volume, by rectal, hypodermic, or intravenous injections, except as noted above. (3) Raising blood-pressure by the use of epinephrin, ergot, or heart stimulants, except in severe shock, when stimulants might be given coincidently with transfusion. (4) Lowering patient's body temperature and increasing shock by use of ice-bags. Keep patient warm instead.

Formulas for Feedings.

		Ounces.
Gelatin solution:	Gelatin	1
	Lactose	3
	Juice of 1 orange	—
	Water	32
Gruel mixture 1:	Cereal gruel (oatmeal, barley, or cornmeal)	16
	Milk	14
	Cream	4
	Lactose	3
Gruel mixture 2:	Cereal gruel (oatmeal, barley, or cornmeal)	12
	Milk	32
	Cream	4
	Lactose	4

First and second days Feedings every 1½ hours	Gelatin solution, 4 oz.	
Third day Feedings every 1½ hours	Gelatin solution, 4 oz. Gruel mixture 1, 4 oz.	alternating
Fourth day Feedings every 1½ hours	Gelatin solution, 5 oz. Gruel mixture 1, 5 oz.	alternating
Fifth and sixth days Feedings every 1½ hours	Gelatin solution, 6 oz. Gruel mixture 2, 6 oz.	alternating
Seventh and eighth days: Feedings every 2 hours	Gelatin solution, 6 oz. Gruel mixture 2, 6 oz. Add to gruel mixture, each time, one of the following: 3 oz. cereal, 1 soft poached egg, custard or jelly.	alternating
Ninth day and thereafter	Ulcer diet.	

Walter A. Bastedo[3] wisely warns against meddlesome treatment and to be cautious in attributing benefit to any of the remedies employed, seeing that most cases recover spontaneously. He thinks that strychnine ($\frac{1}{30}$ gr.) should always be given along with the morphia to counteract relaxation of the stomach Of coagulants he prefers thromboplastin (20 c.c.) or hæmostatic serum (2 c.c.) subcutaneously and repeated in six hours. He gives no food or liquid by the mouth for three days, but saline by the rectum every six or eight hours and a daily cleansing enema. He advises operation if profuse hæmorrhage recurs two or three times in as many days.

REFERENCES.—[1]*Lancet* 1927, ii, 168; [2]*Jour. Amer. Med. Assoc.* 1927, Oct. 22, 1397; [3]*Med. Jour. and Record*, 1927, Sept. 21, 333.

HÆMATURIA, ESSENTIAL.

Sir John Thomson-Walker, F.R.C.S.

In order to justify a diagnosis of 'essential hæmaturia', all the known causes of hæmaturia must be excluded by means of careful and complete investigation. If the hæmaturia is the result of a disease not far enough advanced to be diagnosed at the time of examination, a review of cases followed for a period of years should reveal such disease or diseases, so that the etiology of at least some of the cases of hæmaturia might be ascertained.

H. C. Bumpus[1] has reviewed all the cases of essential hæmaturia seen at the Mayo Clinic up to 1922, and of 165 patients heard from, only 6 report the development of any definite renal disease. In 3 of these calculi developed, necessitating nephrectomy in two, whereas the third passed a small stone spontaneously with relief of symptoms; in the remaining 3 cases, nephrectomy was performed for unknown reasons, possibly because of persistent bleeding. As 105 patients report that they are in good health, 44 that they are in fair health, and only 6 that they are in poor health at present, the idea that the hæmaturia was caused by an early malignant growth or any other serious disease in its early stages may be dismissed. That essential hæmaturia can hardly be due to nephritis, in the ordinary sense of the term, is shown by the fact that no symptoms or urinary changes sufficient to indicate the subsequent development of serious nephritis were discovered. The phenolsulphonephthalein test was carried out in 153 cases: it was never below 30 per cent, and averaged 51·65 per cent, and in 33 cases the blood-urea averaged 32·7 mgrm. per cent data hardly compatible with the presence of nephritis severe enough to produce bleeding. In 199 cases, blood-pressure readings made at the time of the original examination averaged 129·22 mm. Hg systolic and 79·52 mm. Hg diastolic. In 23 cases subsequently examined, the systolic and diastolic pressures had increased more than 10 mm. in only ten cases, and had decreased in nine. In the series of 165 cases, nephrectomy had been performed in 14, in 7 nephritis was demonstrated, and in three of these it was the only demonstrable lesion. It is to be expected that associated nephritis will frequently be present, but the writer believes that some observers have attributed the hæmaturia to this cause erroneously. Decapsulation was performed in six cases, one of which died following a subsequent splenectomy. In the other five bleeding recurred, and from these results it would appear that essential hæmaturia is not due to chronic passive congestion, the symptoms of which are supposed to be relieved by decapsulation. Nephrotomy was performed in 17 of the cases, in 2 of which a subsequent nephrectomy was called for owing to severe post-operative hæmorrhage. Hæmaturia recurred in 7 of these cases at intervals varying from one month to twelve years afterwards. In no case in which nephrotomy or decapsulation was performed was there evidence of a twisted pedicle or other obstruction to the venous outflow. In three of the 14 cases in which nephrectomy was performed, bleeding recurred in the remaining kidney. Of the 165 cases followed up, which were treated medically or which received no treatment after the diagnosis had been made, there has been no recurrence of bleeding in 88 and recurrence once only in 40, whereas in the 37 cases submitted to surgical treatment, bleeding recurred in 15.

Reference.—[1] *Jour. Amer. Med. Assoc.* 1928, i, 593.

HAND, RECONSTRUCTIVE SURGERY OF.

E. W. Hey Groves, M.S., F.R.C.S.

There is probably no field of reconstructive surgery which deserves more careful attention than that relating to injuries of the fingers and hands. We fear that too often an injured hand is left alone after the period when the injured person has accepted his full monetary compensation. Sterling Bunnell,[1] of San Francisco, has done very good work on this subject, and as the result of many hundreds of cases has written a number of most valuable papers recording his methods and results. These are summarized in a recent article full of interesting details. From the manner in which his information was received by his colleagues it is evident that his work and technique are recognized by them as being those of a master. He urges that sensory nerves, when divided by injury, should be repaired by careful suture, even though the affected nerve is only the digital branch running by the side of the finger. After nerve-suture, sensation—in the order of heavy touch, pin-prick, and light touch—is restored progressively down the hand and fingers at the average rate of the length of one finger segment a month. It reaches the degree of stereognosis in an average of twelve months after nerve-suture in a finger, and sixteen months after suturing in the palm.

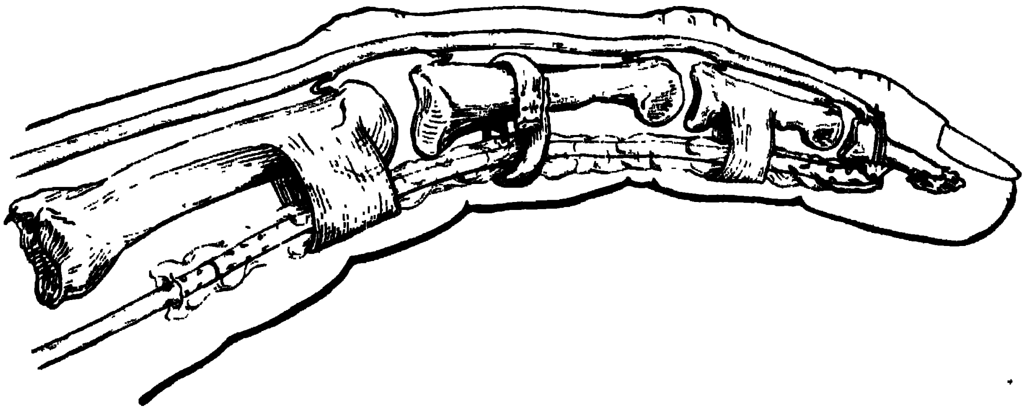

Fig. 27.—Diagram of reconstruction of a tendon in a finger. A *free graft of tendon* plus its paratenon has been threaded through the pulleys (two natural and one reconstructed). The graft is sutured to the profundus in the palm and to the distal phalanx where adhesions will do the least harm. The distal phalanx is first scraped for bony contact. The two sutures pass through a drill-hole in the distal phalanx and are secured through the insertion of the extensor tendon. The extensor tendon forms the posterior part of the capsules of the joints.

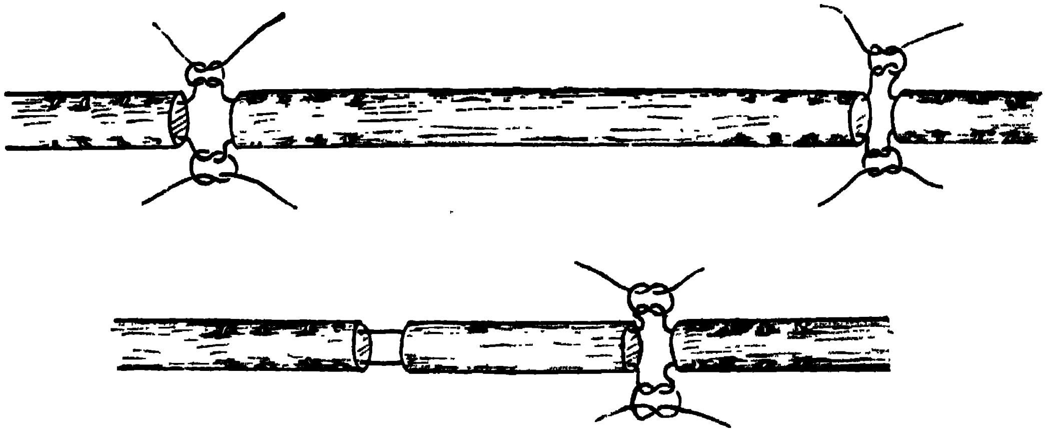

Fig. 28.—Method of suturing a free tendon-graft to bridge a gap in a tendon. Below is shown the method of bridging a short gap. In the latter case, after the sutures have been drawn up and tied, each of the two ends of the graft is lightly attached to the tendon-end by a single stitch of fine catgut merely to maintain approximation. (*Figs.* 27, 28 *by kind permission of the 'Journal of Bone and Joint Surgery'*.)

In regard to the repair of injured tendons, Bunnell is a strong advocate of the use of free tendon-grafts. He holds that it is useless to attempt the direct suture of a cut tendon a long time after the injury. Such a procedure involves great tension and the use of unhealthy tendon-ends. Or if the tendon-ends have not retracted they are probably tied down by scar tissue, which always interferes with free gliding. He freely excises the unhealthy part of the tendon, and uses a free tendon-graft of ample length, one end of which is fixed to the distal phalanx and the other to the cut tendon in the palm of the hand. Where necessary he covers the tendon graft with transplanted paratenon fat and slings it to the adjacent bone by another grafted tendon (*Figs.* 27, 28).

In dealing with stiff joints of the fingers, he advocates neither operative reconstruction nor forcible manipulation, but relies upon gradual postural correction by splints. In the matter of general technique he lays great stress upon fine and gentle dissection. This must be done under absolute hæmostasis produced by an Esmarch's band and tourniquet. The latter is released at the end of the operation before closing the wound. Any hæmorrhage which then occurs is controlled by sponge pressure or fine catgut ligature.

REFERENCE.—[1]*Jour. Bone and Joint Surg.* 1928, Jan., 1.

HARE-LIP AND CLEFT PALATE.

John Fraser, Ch.M., F.R.C.S.Ed.

A series of interesting papers has appeared in connection with the various problems of hare-lip and cleft palate. Their etiology has been the subject of much investigation. Warren B. Davis[1] is a believer in the influence of *heredity*, and he states that out of a record of 426 cases he obtained evidence of the influence of heredity in 57 per cent, and believes that, with more careful investigation, the percentage might have been higher. The original hereditary error in a considerable proportion of the cases was not hare-lip or cleft palate, but the absence of one or both of the permanent upper lateral incisor teeth.

It is, however, around the problem of *treatment* that primary interest lies. In single uncomplicated hare-lip Davis advises the operation at some time between the tenth day and the third month. He practises the Thomson method, a modification of Rose's original operation, and advises the use of a measuring calliper to ensure accuracy of apposition. These are all points upon which there is general agreement, and the uniformly high standard of the results calls for no modification.

In unilateral hare-lip accompanied by cleft palate Davis recommends the closure of the hare-lip and the alveolar cleft at a period between the second week and the fourth month, according to the physical condition of the child. In bilateral hare-lip with a projecting premaxilla he replaces the premaxilla in its alveolar alinement, using for this purpose the circular wire suture, and on the closure of the lip he adopts a procedure which will come as a surprise to many surgeons, for he employs the philtrum to remodel the complete depth of the central portion of the upper lip. It has been our experience that the philtrum is rarely of sufficient depth to permit such a procedure, except at the expense of an unsightly depression of the columella and the tip of the nose. When cleft palate complicates a lip cleft the closure of the palate cleft is delayed until a period between the ninth and the twentieth month, and the operative procedure is done in two stages—a preliminary mobilization of the palate flaps by bone division, and ten days later the uniting of the cleft edges by careful suture. It is interesting to notice that Davis favours the bone-flap method. The procedure was fully reviewed in the MEDICAL ANNUAL last year, but, so far as the writer knows, the operation is rarely, if ever, practised in this country. The reason why it is shunned is the suspicion that an operation of this kind is associated with a forbidding amount of shock; but, in view of the experiences of Davis, Brown, and others, our attitude towards the question might well be reviewed.

That the results of cleft-palate operation are not all that could be desired is evident from the number of suggestions put forward each year. Only a few of these can be garnered here.

J. S. Horsley[2] adopts a technique and procedure which are common to the majority of surgeons in this country. The lip error is corrected by Rose's method within the first few weeks of life, and the palate is closed by the Langenbeck technique at a period between the sixth and eighteenth month. He records 33 cases without a single death or grave post-operative complication. In the pre-operative period an attempt is made to sterilize the mucous surface by instilling 25 per cent **Argyrol** or **Neosilvol** into each nostril every four or six hours for a period of forty-eight hours before operation, while in the post-operative phase the palate wound is sprayed with 2 per cent **Boric Lotion** after each feed. **Retentive Enemata** (6 to 10 oz. of water containing 1 per cent of sodium chloride and 4 per cent of glucose) are given as a routine procedure during the twenty-four hours succeeding operation. Accuracy, gentleness in handling tissues, and attention to detail are the operative points to which attention is directed.

R. E. Farr,[3] in a paper entitled "Some Shortcomings in the Surgery of Cleft Lip and Palate, with Suggestions for Meeting Them", gives us a critical discussion of the various problems. He favours and employs the Brophy technique, and the method is applied in two stages—the preliminary mobilization of the maxilla, followed some days later by the uniting of the cleft edges.

In dealing with hare-lip the author enunciates certain principles to which he attaches importance, and in summary these are: (1) A post-operative manual stretching of the upper lip with a view to relieving tension and preventing contraction or thinning; (2) Division of the nasal septum at its base in order to prevent elevation of the tip of the nose; (3) The use of the prolabium to provide additional length to the columella; (4) The relief of lip tension when necessary by an incision along the laughing wrinkle.

Farr recommends that, in the event of the original plastic operation (and we presume he alludes to the palate) being a failure, a second attempt should be made during the second post-operative week. Our experience has been directly contrary; such a procedure as he recommends has in our hands proved disastrous, and we now make it a rule in the event of failure to delay any further attempt until at least three months have elapsed.

Stirling Bunnell[4] ascribes the failure which attends a certain proportion of cleft-palate operations to the pressure and sucking action of the baby's tongue, and he attempts to guard against this by providing a palate protector made of perforated sheet silver.

The palate operation is done in two stages, and a period between the second and third month is chosen. The first stage of the operation is concerned with the separation of the mucoperiosteum with or without relief incisions. At this stage a cast of the hard palate is taken, and upon it the silver 'protector' is modelled. The second operation, a week later, is concerned with the closing of the palate, and when this has been accomplished, the silver plate is fastened in place by means of wires which emerge from the mouth and hook upon a narrow plaster fillet applied around the head. After each feed the plate is lowered to permit of irrigation, and the suture line and its surroundings are brushed over every few days with a 1 per cent alcoholic solution of brilliant green and crystal violet. It is important to notice that the plate does not rest upon the palate, but upon the alveolar margin.

Professor H. Frumd,[5] of the University of Bonn, discusses the **Reich-Matti Operation** for the correction of double hare-lip. This is a procedure which is rarely practised or quoted in this country, and it is therefore well to draw attention to it, for it has advantages in certain difficult cases. The method was employed in seven cases of complete double hare-lip with projecting premaxilla. The principle of the operation is to use the philtrum as a substitute for the nasal septum. The philtrum is dissected from the front of the premaxillary bone by a transverse incision which runs along the junction of skin and mucous membrane, the 'lid' of the philtrum being therefore left attached to the premaxilla; and this is one of the most important details, for not only does it provide a certain amount of mucous membrane which is of use in the closure of the lip cleft, but it ensures that the anterior or cutaneous portion of the philtrum, which is to be used as a substitute for the nasal septum, shall be sufficiently thin and mobile to be moulded into shape *in situ*. The separating incision is continued upwards into the cartilaginous septum, and thereafter the vomer is cut through. The surgeon is now able to replace the premaxilla

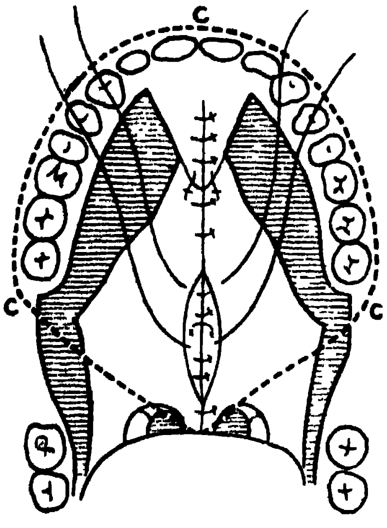

Fig. 29.—Illustrating Limberg's operation for cleft palate. The broken line C indicates the outline of the protective celluloid plate used after the operation.

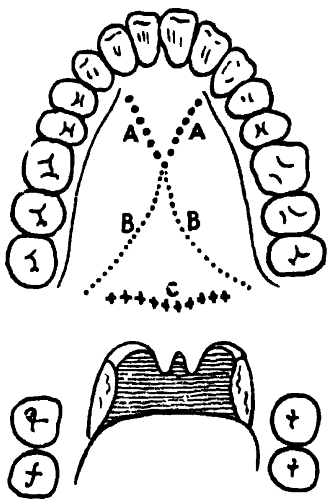

Fig. 30.—Illustrating hidden cleft of the hard palate. A, Lvov's incision; B, Posterior bone margin; C, Normal bone margin.

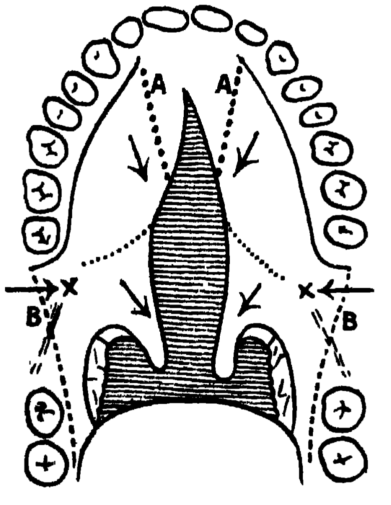

Fig. 31.—Diagram of cleft palate, showing A, Ganzer's incision, and B, Ernst's incision.

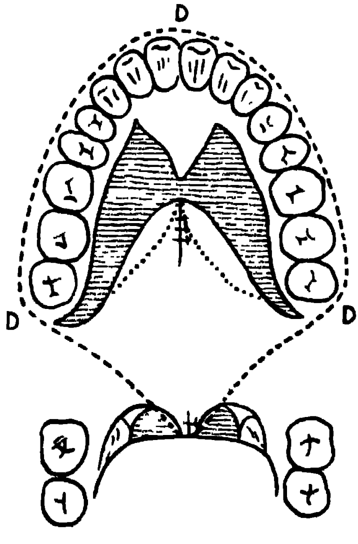

Fig. 32.—Illustrating the operation of retro-transposition of the palate. D, Outline of the protective celluloid plate.

(*Figs.* 29–32 *re-drawn from* '*Zentralblatt fur Chirurgie*'.)

without inducing down-letting of the nose, and the detached anterior or cutaneous portion of philtrum is moulded so as to occupy the gap and to replace the nasal septum. Matti suggests that small lateral flaps should be cut from the labial end of the philtrum and each sutured sideways to the alæ nasi. After the philtrum is in place the lip edges are pared and closed, and it is then that the advantage of the mucous portion of the philtrum, which was left attached to the premaxilla, becomes apparent.

In order to diminish tension on the lips an ingenious system of traction is employed. Strips of gauze are secured to the cheeks by spirit gum or collodion, and are crossed so that a pull on the free ends relieves upper-lip tension. The free ends are secured to lateral wires incorporated in a plaster skull cap.

A paper by Professor A. Limberg,[6] of Leningrad, entitled "New Methods in the Treatment of Cleft Palate", will repay a careful study. It may seem at first sight that the methods suggested are unusually drastic, but against this we have the professor's assurance that in 45 cases 44 healed by first intention—a record so good that we must give the fullest consideration to his methods.

The details are too specialized for complete summary, and those interested are recommended to consult the original paper. The methods are perhaps best appreciated by a study of the diagrams taken from the original. It may be said that three methods are discussed: (1) Fissurorrhaphy; (2) Retro-transposition of the palate; (3) Narrowing of the mesopharynx. The author is critical of the results of fissurorrhaphy, and we gather that he rarely uses it. The operation of retro-transposition of the palate is appreciated from the accompanying diagram (*Fig.* 29). It will be seen that, in addition to the lateral Langenbeck incision, secondary incisions are planned so as to secure free mobilization of the soft palate and the mucoperiosteum of the hard palate. The incisions favoured by the author are those of Lvov (*Fig.* 30) for cleft of the soft palate, and of Ganzer (*Fig.* 31) for the more complete type of cleft. The operation of narrowing the mesopharynx, if employed in its entirety, is a complicated procedure. It entails a separation of the palato-pharyngeal folds by lateral incision, and in certain cases the mobilization of the hamular processes and the pterygoid plates and that part of the posterior end of the palatal portion of the maxilla which carries the posterior palatine vessels and nerves. The reviewer confesses that he speaks without practical experience of the last-mentioned method, but it would appear to be a most complicated and difficult procedure, and with such extensive bone division a considerable measure of shock would be anticipated. No details of after-treatment are given except that it is recommended that a celluloid plate should be fastened *in situ* over the palate roof in order to protect the parts from irritation by the tongue (*Figs.* 29, 32).

REFERENCES.—[1]*Ann. of Surg.* 1922, April, 536; [2]*Virginia Med. Month.* 1927, liii, 782; [3]*Minnesota Med.* 1927, x, 70; [4]*Surg. Gynecol. and Obst.* 1927, Oct., 530; [5]*Münch. med. Woch.* 1928, June, 1067; [6]*Zentralb. f. Chir.* 1927, July 9, 1745.

HAY FEVER. (*See* ASTHMA AND HAY FEVER.)

HEAD INJURIES.

Geoffrey Jefferson, M.S., F.R.C.S.

Concussion.—Practically every head injury severe enough to be seen by a medical practitioner has concussion of more or less severity. The difficulty is to know where concussion ends and more serious brain disturbance begins, though the modern view is that concussion is a very temporary thing and should be recovered from in a few hours (not more than twelve, though any such delimitation must be purely empirical). Any case in which unconsciousness is prolonged means that microscopic or gross injury has occurred. G. G. Miller[1] has conducted experiments on animals, trying the effects of blows on the head, and concludes that concussion is an immediate event, and tends to spontaneous recovery without obnoxious sequelæ. The condition, according to this observer, is not due to anæmia, as Trotter has held, but to mechanical effects on the cells. The respiratory centre is the first important one to be affected, and artificial respiration may save the experimental animal, as the paralysis is temporary only. Much more important than pure concussion, because it is so frequent a concomitant, is gross cerebral injury, notably œdema and intracranial hæmorrhage. There is probably no syndrome in the whole range of medicine so well known as that of middle meningeal hæmorrhage, but the clinical picture more commonly denotes intra- than extradural bleeding. We do well to be on the watch for the occurrence of these extradural hæmorrhages, the mortality of which remains about 50 per cent after all the years that have elapsed since its clear recognition.

Subdural Hæmatoma.—F. C. Grant has recently reported 3 cases,[2] C. W. Rand 7 cases,[3] R. A. Griswold and F. Jelsma 8 cases.[4] The symptoms are very similar to those of middle meningeal hæmorrhage; there is commonly the same latent period, though it may be much longer, increased pressure with slow pulse, whilst paralyses are common. The bleeding comes from the lacerated cortex or contused poles of the brain. Grant's cases illustrate how trivial the cerebral injury may be. In one case a man fell downstairs and was dazed for a few moments after the accident, which was not regarded seriously. He returned to work in ten days, but a week later headache and aphasia developed, and in another month he was quite incapacitated. X rays revealed a fracture in the left posterior parietal region. At operation an old extensive subdural clot was found and removed, with return to work in three weeks. In another case a woman of 67 years fell and bumped the back of her head. It was not known whether she was unconscious or not, but she worked the next day. On the second day she developed headache and dizziness, but she continued to work for a month, when it was found that she had a right facial palsy; two weeks later she began to vomit, developed speech defects, and became stuporous. No fracture was seen on X-ray examination. A large organized blood-clot was found over the left hemisphere at operation, and the patient was well three years later. These two examples illustrate the chief clinical points to be expected in the more chronic of these cases. It will be noted that the injury is often slight, and that the development of the hæmorrhage is often slow—slower certainly than is the case in middle meningeal hæmorrhage, in which condition the patient is either relieved by operation or dead within three or four days from injury.

The reviewer has met with examples of these hæmatomas, evacuation of which can give the most dramatic and gratifying results. The point to be recognized is this: that whilst nearly every case of severe brain injury carries with it the possibility of subdural hæmorrhage, rupture of the middle meningeal artery, on the other hand, requires a much more specialized mechanism for its production. It must be admitted that, although the middle meningeal artery can be torn without the skull being broken, the majority of ruptures are associated with fracture, a condition by no means necessary for pure brain injury. And further, whilst a great number of fractures of the skull certainly run down into the middle fossa, the line of the fracture is generally well behind the track of the vessel. If we are on the watch for a subdural hæmatoma, which may occur either early or late, we shall not easily miss the extradural hæmorrhages either.

Post-traumatic Headache.—As W. Penfield[5] very truly says, patients complaining of headache and dizziness after an injury to the head have been rather unwelcome patrons of most clinics. The absence of physical signs entices one to make the diagnosis of traumatic neurosis. Penfield discovered accidentally that air-injection by the lumbar route relieved the headache in a remarkable manner. In his first case 50 c.c. of cerebrospinal fluid was withdrawn and 42 c.c. of air injected; in the second, 50 c.c. was removed and replaced; in the third, 95 c.c. was removed and 84 c.c. replaced. The quantity of fluid abstracted depends on the amount which can be easily obtained without inducing too severe pain in the conscious patient.

The reviewer has used the method on two occasions, and although the proceeding is empirical—for we no more clearly understand the workings of the air in giving relief than we understand the precise nature of the condition for which it is done—there is no question that the benefit experienced is great. So far none of the patients have relapsed, though time will surely show us that the method is not infallible. But in bad cases it is well worth a trial.

REFERENCES.—[1]*Arch. of Surg.* 1927, April, 891; [2]*Ann. of Surg.* 1927, Oct., 485; [3]*Arch. of Surg.* 1927, June, 1136; [4]*Ibid.* July, 45; [5]*Surg. Gynecol. and Obst.* 1927, Dec., 747.

HEAD INJURIES IN CHILDREN.

John Fraser, Ch.M., F.R.C.S.Ed.

Fenwick Beekman[1] contributes an article on this question, which, as it is based on the observations of the author in 331 cases in children under the age of thirteen years, is stamped with the hallmark of a wide experience. The cases are divided into two groups: (1) Those showing fracture of the skull with or without brain injury; (2) Those showing signs of intracranial injury without fracture of the skull. The first group contained 214 cases, the second 117. Thirty-eight cases died, and it is significant that all were in the fracture group. There are many fractures which can only be detected by the aid of X rays, but the author wisely reminds us that, if full value is to be derived from the investigation, the exposure must be made in a variety of planes. A child may have a most extensive fracture of the skull vault and yet remain practically free from symptoms. The reason evidently lies in the loose manner of the dura attachment in this region. On the other hand, in the skull base the dura is closely adherent to the underlying bone, and therefore is easily lacerated in a basal fracture of any severity. The loose attachment of the vault dura is probably the explanation of a second striking fact in this clinical study—that in such a rich variety of head injuries there was no example of extradural hæmorrhage. The shallow vessel-grooves of early age are probably the other factor which explains the absence of this complication.

No simple depressed fracture of the skull was operated on, and, as far as we can learn, no unpleasant sequelæ resulted. The surgeon was evidently taking advantage of the tendency which the child's skull has to readjust any localized depression of the vault. In contrast to this, we learn that the usual surgical maxim was observed of operating on every example of compound fracture.

The *sequelæ* which may result from severe head injury are matters of great importance. Beekman gives us valuable information on this point. Reverting to the original classification, we find that in Group 1 (the fracture group) 33·3 per cent showed symptoms, while in Group 2 (the intracranial group) 7 per cent showed symptoms. We confess that these results surprise us. We would have expected the larger proportion of sequelæ to arise in the intracranial group, and it is on just such a point as this that Beekman's paper is so important. It is comforting to read that in the vast majority of the cases sequelæ ultimately disappeared: 70 per cent of those originally affected were entirely cured within a period of from one to two years after the injury; in 5 per cent there was a possibility of permanent damage or derangement.

Of the different sequelæ, the most important were headache, vertigo, and mental instability of varying degree. Headache occurred in twenty-five cases. It was sometimes accompanied by such disturbances as emotional change or by vomiting, and it was often spasmodic in type, its onset definitely synchronizing with a state of tiredness, and it was almost invariably localized to the frontal region. While headache might be a sequel to a simple concussion, its most frequent antecedent was a fracture of the base. The symptoms disappeared within a period of two years in every instance except one—that of a compound fracture of the vault, which for some reason had not been operated on. Vertigo was the sequel in two cases, both examples of fracture of the mid-fossa, and in both cases recovery followed within eighteen months. There was evidence of mental derangement in nineteen cases, varying from a simple excess of emotionalism to a complete change in character. The preceding error was one of fracture in all but three cases, and of the total number ten made a complete recovery, six were improving, and three have shown a derangement which has persisted over two years.

The paper concludes with a statement which should be kept in mind by all who are in any way lacking in experience in this class of case: "Operative interference should only be carried out in the presence of a definite indication."

REFERENCE.—[1]*Ann. of Surg.* 1928, March, 355.

HEADACHE, POST-TRAUMATIC. (*See* HEAD INJURIES.)

HEALTH VISITORS.

Joseph Priestley, B.A., M.D., D.P.H.

At last the health visitor has come into her own, and certainly not before she well deserved it. The work of a health visitor is all-important in any efficient municipal or public health administration. The work that she does, quietly and unobtrusively, is well known to all medical officers of health, and its value is coming daily to be more and more recognized by sanitary authorities in connection with child welfare work and the reduction of infantile and child mortality and morbidity. It is only just, therefore, that her work should be officially acknowledged, and that the officer should be taken under the official wing and protected, as far as possible, as to training, salary, and appointment. The Ministry of Health has issued an order, known as Health Visitors Circular No. 879, the object of which is to protect health visitors, and to bring them more into line with medical officers of health and sanitary inspectors. This is all to the good of the public health service, and will prove of lasting value in the future. All *future* health visitors will require to be properly trained (as shown by certification) before accepting office, as from April 1, 1928, and will be entitled to "a reasonable salary under satisfactory conditions of service" afterwards and consequentially. Existing non-certificated officers are provided for under the Circular, so as to prevent injustice. The old must give way to the new, and the non-certificated health visitors (fortunately a small proportion of the total) will gradually be replaced by the new school of certificated (and highly certificated) officers. This is true official progress, carried out, as it should be, without hitch or injustice. The date, April 1, 1928, was settled by the Ministry of Health in the official communication of 1925, so that ample time has been given for the change-over. In future, grants will only be paid in connection with officers duly certificated in the terms and conditions set out in Circular 879. An official list of all health visitors who are at present in office has been prepared by the Ministry of Health, and is available for consultation by sanitary authorities who may be considering the claims of any particular health visitor as to qualification, experience, etc.

The training of health visitors is dealt with in the Circular, more especially with regard to unemployed nurses and midwives who are not in a position to afford the extra expenses connected with the obtaining of the special extra health visitors' certificate (as now compulsory). For this purpose a sort of probationship is suggested and has been approved—the so-called probationary period being accompanied by salary, which is to be paid for services rendered.

HEART, ACTION OF DRUGS UPON. (*See also* ARRHYTHMIA.)

A. G. Gibson, M.D., F.R.C.P.

Digitalis.—J. Hay, H. W. Jones, and P. Ince[1] have examined the effect of digitalis in a series of cases of heart failure with a normal rhythm. Their cases included those with valvular disease and those with hyperpiesis. The pulse-rate usually fell; there was no alteration in blood-pressure, either systolic or diastolic, in two cases of hypertension; in one case with considerable œdema there was a fall of 15 mm.; in two other cases there was a lowering of the diastolic pressure. They conclude that digitalis is indicated in cardiac failure with normal rhythm when œdema is present irrespective of which valves may be affected. An improvement was noticed in some of the cases without œdema. Slowing of the heart does not imply subjective improvement, and it frequently indicates the onset of toxic symptoms. No diuresis is seen unless œdema is present, and a diminution in the output of urine is an early sign of intoxication.

C. C. Wolferth[2], and R. L. Levy and T. T. Mackie[3], treat of the therapeutics of digitalis and the manner in which it may be used with more precision. In simple tachycardia no adequate control of the rate can be obtained. As regards the arrhythmias, it must be realized that digitalis itself is capable in toxic doses of producing sinus arrhythmia, auriculoventricular nodal rhythm, extrasystoles, paroxysmal tachycardia, various grades of heart-block, and pulsus alternans. Levy and Mackie advise its use against frequent extrasystoles. Digitalis has its most important use against auricular fibrillation, in which its action is to block some of the numerous impulses from the auricle to the ventricle travelling along the junctional tissues. In this action it controls and therefore rests the ventricular contraction. It acts best, therefore, when the ventricular rate is rapid, especially if heart failure is present at the same time; in fact, congestive failure and œdema apart from rhythmic disturbance form the main indication for its use. It is useless to push digitalis to the extent of lowering the pulse-rate below what may be considered optimum for the patient, and here is where its value is much less in that form of fibrillation in which the pulse is slow.

Cases of auricular flutter treated vigorously with digitalis frequently revert to auricular fibrillation, when if the digitalis be abruptly stopped a return to a normal rhythm may be seen. Wolferth found 50 per cent of his cases thus revert to the normal rhythm. Wolferth's experience in auricular tachycardia of the paroxysmal type is that digitalis exerts a favourable influence, as against the experience of other observers. There is little evidence that digitalis is capable of suppressing recurrent fibrillation or flutter. The reviewer, however, has observed a case of paroxysmal fibrillation of over thirty years' duration in which digitalis therapy exerted a marked influence in lessening both the severity and length of the attacks.

H. Gold and A. C. de Graff[4] describe their experience with digitalis in a cardiac clinic dealing with ambulatory cases for whom it is desired to use a preparation that will give a constant and effective dose. They have found it best to give the drug in a single daily dose in tablet form of the compressed powdered digitalis leaf. Such a preparation retains its potency at least up to five years.

G. J. Langley[5] finds that different preparations of the tincture of digitalis give very different effects, both as regards their toxicity and their power of reducing the pulse-rate. Reliable biological standardization is therefore urgently needed, for without such standardization the full benefit of Eggleston's massive method of administration cannot be obtained. The biological assay should be further related to results obtained in human cases.

Quinidine.—C. W. Barrier[6] points out in regard to the use of quinidine that it is impossible to tell beforehand which patients will react favourably. Only a trial can determine. He uses the method of Levy, testing first for idiosyncrasy by giving 2 doses of 2 gr. on the first day, then 3 doses of 6 gr., and increasing by a dose a day until the patient is taking 5 doses of 6 gr. When normal rhythm is restored the quinidine should be continued by giving a dose night and morning, the amount of which must be judged in each case. Proper management to ensure success includes rest in bed and proper control of diet and sleep. It is best not to give digitalis as well, nor should it be given previously unless there has been heart failure. The contra-indications for its use are old age, marked hypertrophy, chronic heart failure, and active endocarditis. Instances of its beneficial use are quoted in paroxysmal auricular fibrillation, in auricular flutter, and in paroxysmal tachycardia.

E. P. Maguard, jun.,[7] examines his results with quinidine in 53 cases of auricular fibrillation; 71 per cent of these cases returned to the normal rhythm, 47 per cent kept this rhythm for a month or more. Auricular fibrillation tends to become permanent, and some cases relapse many times after restoration of normal rhythm. One case of collapse and sudden death occurred in the series. Of toxic rhythms induced by quinidine there are described auricular flutter and ventricular paroxysmal tachycardia. In those in whom compensation was good, normal rhythm was established in 90 per cent. The author's method was to give 2 doses each of 0·2 grm. the first day. If no ill effect occurred the next day the patient was given 0·4 grm. every two hours for 5 doses. This dose was cautiously increased to 0·6 grm. or 0·7 grm.

Strophanthin.—E. E. Cornwall[8] describes the different forms of strophanthin and their uses. That in ordinary use in Britain and America is amorphous strophanthin prepared from *Strophanthus kombé*. It is highly desirable that all products for clinical use should be physiologically standardized. A crystalline product called **Ouabaine**, from *Strophanthin gratus*, is in common use in France and is held by Vaquez to be a stable and little-toxic drug in the usual doses. Given under the skin it loses some of its power, which is still further diminished if given under the tongue.

H. v. Hoesslin[9] gives a caution against the inevitable use of strophanthin and its abuse in cardiac patients. He shows by an analysis of sudden death in various types of cardiac cases that there is a slight excess of cases amongst those who have been treated by strophanthin. The figures dealt with are not large, and it would seem that a more extended experience would be more reliable as a guide. While all clinicians will agree with the injunctions against over-drugging, we must realize that frequently in using strophanthin we are dealing with desperate cases, and a risk in giving intravenous therapy in these cases is frequently present from emboli that may suddenly become detached.

C. Eggleston and T. J. White[10] have investigated the sublingual and the perlingual (i.e., application to the dorsum of the tongue) methods of administering amorphous strophanthin. Their study concerned fifteen patients under rigid methods of control, and they failed to find any evidence of satisfactory absorption by either method; moreover, the excessively bitter taste of the drug rendered the method very objectionable to the patients. All the patients except one were proved to be fully responsive to the oral administration of digitalis.

H. Vaquez and R. Lutembacher[11] discuss the proper use of **Ouabaine** (Arnaud). As compared with digitalis it is very soluble and diffusible, and unlike digitalis it is quickly eliminated. Ouabaine is specially valuable in cases of permanent dilatation of the heart which do not react to digitalis; there are other cases, too, in which digitalis fails—those showing a dissociated action of the drug, in which the frequency and irregularity are bettered but in which the œdema persists. Ouabaine produces a diminution, often remarkable, in the volume of the heart at the same time that the gallop rhythm disappears. Its rapid elimination is an advantage, for if there appears bigeminy in auricular fibrillation, or heart-block, indicating that intoxication by the drug is imminent, these evidences, if they be due to the drug, disappear almost instantaneously on omitting it. The major indication for ouabaine, therefore, is cardiac dilatation, whether from an increase in peripheral resistance or myocardial insufficiency; the second is in the cases of refractory failure in which no improvement has been effected by digitalis. After a few doses of ouabaine these cases frequently regain their power to react to digitalis. Another variety of insufficiency that is an indication for ouabaine is the failure of the right ventricle owing to changes in the lungs, fibrosis, spinal curvature, and bronchiectasis. Its effect is good in the cardiac failure of cases of renal disease. The authors insist that the only efficient way of getting the therapeutic effect is by intravenous injection. The method is to inject 0·25 mgrm. daily for five or six days so as to give a total of about 2 mgrm. For cases of cardiac failure 1 mgrm. may be given in one dose. With due attention to dosage, accidents have been eliminated. The authors insist, however, on the necessity when using ouabaine to make careful examination of the heart and circulation, including electrocardiography to detect at once any rhythmic variation that might be due to the drug.

Euphyllin.—F. M. Smith, V. C. Graber, and G. H. Miller[12] find that euphyllin, one of the caffeine series, is satisfactory as a diuretic in the treatment of cardiac disorders. It is not objectionable, and it can be taken for weeks or months without producing gastro-intestinal irritation. It does not interfere with the eliminating action of the kidneys. The drug is given in doses of 1½ gr. by mouth after meals. Their cases have been confined to those with arteriosclerosis; in thirty out of a total of forty cases there was evidence of cardiac failure and œdema.

L. Bluin and P. Carlier[13] report certain observations in the *treatment of œdema* which show that a mercurial diuretic such as **Neptal** has much less value if used alone than if preceded by at least three days in which the patient is given 10 to 12 grm. of **Calcium Chloride** or **Ammonium Chloride**. By this method patients have been induced to excrete up to 6 litres of urine. The disability of the method is the taste of the enormous dose of calcium or ammonium chloride, which is nauseating, and in the case of chloride of calcium sometimes burns the throat. Care is necessary when danger is apprehended from deficient kidneys.

REFERENCES.—[1]*Quart. Jour. Med.* 1927, Oct., 153; [2]*Amer. Jour. Med. Sci.* 1927, Dec., 760; [3]*Jour. Amer. Med. Assoc.* 1927, ii, 432; [4]*Ibid.* 1928, i, 1016; [5]*Proc. Roy. Soc. Med.*, 1928, April, 1067; [6]*Jour. Amer. Med. Assoc.* 1927, ii, 742; [7]*Amer. Jour. Med. Sci.* 1928, Jan., 55; [8]*Med. Jour. and Record*, 1927, July 6, 25; [9]*Münch. med. Woch.* 1928, April 13, 652; [10]*Jour. Amer. Med. Assoc.* 1927, ii, 583; [11]*Presse méd.* 1928, Feb. 1, 129; [12]*Trans. Amer. Med. Assoc.* (Sect. of Pharmacol. and Therap.) 1926; [13]*Presse méd.* 1928, March 21, 353.

HEART DISEASE. (*See also* ANGINA PECTORIS AND CORONARY ARTERY DISEASE; ARRHYTHMIA; CARDIAC DYSPNŒA; ENDOCARDITIS; HEART, ACTION OF DRUGS UPON; HEART MURMURS; PERICARDITIS.)

A. G. Gibson, M.D., F.R.C.P.

Heart Disease and Pregnancy.—B. E. Hamilton's[1] article on heart disorders deals mainly with the management of labour in cardiac disease. He subdivides patients into three classes: Class III have cardiac symptoms but no cardiac disease and are mainly functional cases; these are in no serious danger from pregnancy. Class II includes cases of doubtful cardiac disease, and cases with some lesion but with no interference with cardiac reserve; of 207 cases watched through pregnancy there were 2 maternal deaths and 7 baby deaths; there were no cases of cardiac failure. Class I cases include gross enlargement of the heart, diastolic murmurs, a significant disorder of rhythm, or a history of cardiac failure. Of 207 consecutive cases, there were 18 maternal deaths. 46 baby deaths, and 52 cases with signs of cardiac failure. Roughly 20 per cent of all the maternal deaths in the Boston City Lying-in Hospital has been furnished by Class 1 cardiacs. Heart disease complicating pregnancy constitutes, therefore, a major obstetrical problem, of which the first important thing is a proper classification of patients. Class I patients are all treated in hospital. The author discusses amongst other matters the régime for patients with damaged hearts in pregnancy, the importance of the avoidance of infection, and the question of sterilization.

Certain aspects of cardiac disease in relation to pregnancy are becoming clearer since the time when Mackenzie charged the profession with its lack of attention to this important side of practice. J. Hay and E. Hunt[2] have published their conclusions from a study of cases at the Heart Clinic of the Royal Infirmary of Liverpool. Pregnancy and labour even under normal conditions put a strain on the heart; especially is this so if labour is prolonged and the reserve power of the heart is called upon to meet it. During pregnancy there is an increased liability to cardiac failure.

The earliest signs of cardiac failure are: (1) Dyspnœa, which is a normal feature up to a point in the later months of pregnancy; (2) Œdema of the lung bases; (3) A steady increase in pulse-rate over the normal increase of 20 per minute. The extent and severity of the symptoms must be the main guide in treatment. Out of 50 cases, 35 have been cases of mitral stenosis. There is a peculiar liability to hæmoptysis, not confined to these cases of mitral stenosis.

Auricular fibrillation is a serious condition for labour, but there is no need to induce labour until thorough treatment by digitalis has been tried and has failed.

There is a difference of opinion as to the relative merits of induction and Cæsarean section, and each case must be judged on its merits. The worry to the mother is less in the latter, but the period subsequent to operation is more trying. Bellingham Smith, of St. Bartholomew's Hospital, is quoted as of the opinion that normal labour at term is less exhausting than induction. In 50 consecutive cases there were 5 deaths, 3 of which succumbed to nephritis. Hay and Hunt give the following masterly summary:—

"The mere presence of mitral stenosis or even aortic regurgitation, the occurrence of premature beats, the existence of cardiac pain and tenderness over the cardiac thrust, and the presence of cardio-respiratory bruits, do not in themselves justify a childless marriage. So long as the cardiac reserve is good, so long as the response to effort is satisfactory and there is no undue enlargement of the heart, the presence of valvular disease is no bar to marriage or pregnancy. When, however, there is a clear history of cardiac failure and distress during a previous pregnancy . . . then a definite veto must be given." The same veto applies to auricular fibrillation, advanced mitral stenosis, or advanced aortic regurgitation. "A pregnant woman who is aware of her cardiac disability should be reassured. Too often the risks are unduly stressed. . . . The necessity for careful supervision must be emphasized. . . . Motherhood is woman's peculiar privilege and prerogative, a privilege which we have no right to refuse her without adequate reason."

Vital Capacity in Heart Disease.—H. W. Jones[3] compared the vital capacity of 100 normal persons with 50 cases of cardiac disease. He finds the figure much lowered in disease. He finds the percentage vital capacity as compared with the normal a very good index of the amount of dyspnœa—e.g., in those in which the figure was above 60 per cent the dyspnœa was not very marked, those with figures between 60 and 40 per cent showed a moderate amount of dyspnœa, below 40 per cent there was considerable dyspnœa, while below 30 per cent the patient was usually confined to bed with orthopnœa.

Treatment.—It is not always realized in practice that the treatment of cardiac disease has many other sides than the use of drugs. P. D. White[4] draws attention to this aspect of cardiac therapy. The most important of these is **Rest and Recreation.** In a chronic case some amount of freedom of choice must be left to the patient as to how far he is to lie up, but he must not be allowed to put himself or his family in jeopardy. Each case must be considered individually. It may be best to allow a man to do a few days' work to settle certain matters of business rather than to insist on his going to bed at once. It is wiser to prescribe too much rest than too little. If a serious cardiac condition that requires restriction of effort is discovered accidentally, then a full explanation to the patient is the only course possible. Mental rest is just as important as physical rest; the circumstances of each case require examination and adaptation to those circumstances. It is useless to treat a patient who is still within reach of the telephone and may be worried by business letters.

There are all degrees of rest in bed, from absolute rest in which no movement on the part of the patient which can be avoided is permitted, to the modified rest provided by either sitting up in bed or in a chair, necessary when cardiac distress is great. A caution is given against over-examination, either of the history or physical examination, necessary though they be. Rest in bed is urgent for rheumatic heart disease in the active state, cardiac infarction, and muscular failure generally. Six weeks to two months is not too much for cardiac infarction, which may take six months to heal. The author also discusses psychotherapy, exercise, massage, hydrotherapy, ultra-violet rays, climate, and diet.

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HEART INJURIES.

Sir W. I. de C. Wheeler, F.R.C.S.I.

It is well to have some familiarity with this subject. When a patient presents himself with hæmorrhage from a wound in the heart, there is no time to consult literature, and immediate operation must be resorted to for any hope of success. The embarrassment of the heart's action during slow hæmorrhage is due to the accumulated blood and clot in the pericardial cavity. During operation, every effort must be made to reach the pericardium as quickly as possible. When the incision is made into this sac there is often what appears to be appalling hæmorrhage owing to the escape of accumulated blood, but as a matter of fact the escape of the blood is life-saving. There is an instant decompression, and the action of the heart is steadied.

H. H. Schoenfield[1] gives a tabulated list of various published cases. Between the years 1923 and 1926 he found 25 cases, 16 of which recovered. The majority of injuries of the heart reported in the literature are stab wounds, usually with sharp instruments, and less frequently they are gunshot wounds. The classical symptoms described many years ago include: an anxious expression, with restlessness; the patient may be unconscious; there is marked shock, with pallor and cyanosis, and the skin is covered with cold sweat; there is usually dyspnœa, the pulse being feeble and fast; a wound is seen over the precordium which frequently does not bleed extensively; the heart-sounds are distant. The diagnosis is not easy; pulmonary, pleural, and pericardial injuries may give identical symptoms. The surgical treatment should be prompt, and since this has been recognized the mortality has fallen from 68 to 30 per cent. A case is reported of a child, age 5 years, with a history of having fallen upon a pair of scissors. There was a puncture wound in the fourth left costal interspace, about one inch from the edge of the sternum. The heart-sounds could not be heard. There was profound shock. An X-ray examination was made. The heart was shown to be normal in size and position and the lung field clear. Operation was undertaken within a couple of hours. A superficial flap of soft tissues was raised extending from the chondrosternal junction to the costochondral junction. The flap was turned laterally. The third and fourth ribs were cut through in two places, the internal mammary artery was tied, and the pericardium was exposed. The heart, as well as the pericardium and superficial tissues, showed a small puncture, which extended longitudinally on the anterior surface of the left ventricle about one and a half inches above the apex. On contraction, a stream of blood was ejected from this orifice. The wound was closed with two interrupted silk sutures, and the pericardium and superficial tissues were sutured without drainage. The child was discharged from hospital about five weeks after operation. Recovery was complete.

REFERENCE.—[1]*Ann. of Surg.* 1928, June, 823.

HEART MURMURS. *A. G. Gibson, M.D., F.R.C.P.*

P. D. White[1] has classified the apical heart murmur met with in 2500 patients referred to him for cardiac disease or suspicion of such. Systolic murmurs may be transmitted from the base, as in aortic stenosis, aortic dilatation, aneurysm, and pulmonary stenosis. Diastolic murmurs so transmitted are from aortic regurgitation or a Graham Steell murmur. Apical systolic murmurs not transmitted from the base are divided into: (1) Slight; of 400 of these cases 56 per cent had definite heart disease, and 12 per cent of these were rheumatic in origin. (2) Moderately loud; such murmurs occurred in 1000 cases, and 86 per cent of these had definite organic heart disease. (3) Very loud systolic murmurs occurred in 270. of which 98 per cent had organic mitral stenosis; in 6·4 per cent the murmur was associated with aortic regurgitation.

REFERENCE.—[1]*Amer. Jour. Med. Sci.* 1927, Dec., 731.

HERNIA. *A. Rendle Short, M.D., F.R.C.S.*

Femoral Hernia.—A. Edmunds,[1] remarking that most modern writers seem to regard operations from below as archaic but that he still holds a brief for Nicoll's technique as modified by himself, describes how he does it. The main principle is, after ligaturing the sac, to sew Poupart's ligament down to the pubic bone drilled with two holes for the purpose. He uses an ordinary carpenter's gimlet for this. The suture material is stout silk, drawn through by the aid of a wire guide. No figures are given as to recurrence. [We believe the inguinal operation, with high ligature of the sac, and suturing the internal oblique to the periosteum behind the pubes, to be the best. Of 28 cases recently followed up, 27 were certainly, and the remaining one probably, free from recurrence.—A. R. S.]

Inguinal Hernia.—F. G. Connell[2] believes that the essential step is to repair the internal ring (*Fig.* 33), which Bassini's operation does not do. The tissue used for this purpose is the transversalis fascia, and the internal oblique is left lying in front of the cord. If the fascia is too weak, one of the fascial graft methods is employed. Of 137 cases with the internal oblique sutured behind the cord (i.e., Bassini), 5·8 per cent recurred; of 162 treated as just described, 2·46 per cent recurred.

J. Selinger,[3] on the other hand, maintains that the Bassini operation, " which has stood the test for forty years . . . has been performed under all sorts of conditions by countless operators with a wide range of experience—from none up ", gives results that are not likely to be surpassed. In his hands, of 264 cases followed up, only 6 recurred, i.e., 2·25 per cent. The main causes of recurrence are sepsis, hæmatoma formation, cough, and persistent vomiting. Poor musculature is an important factor.

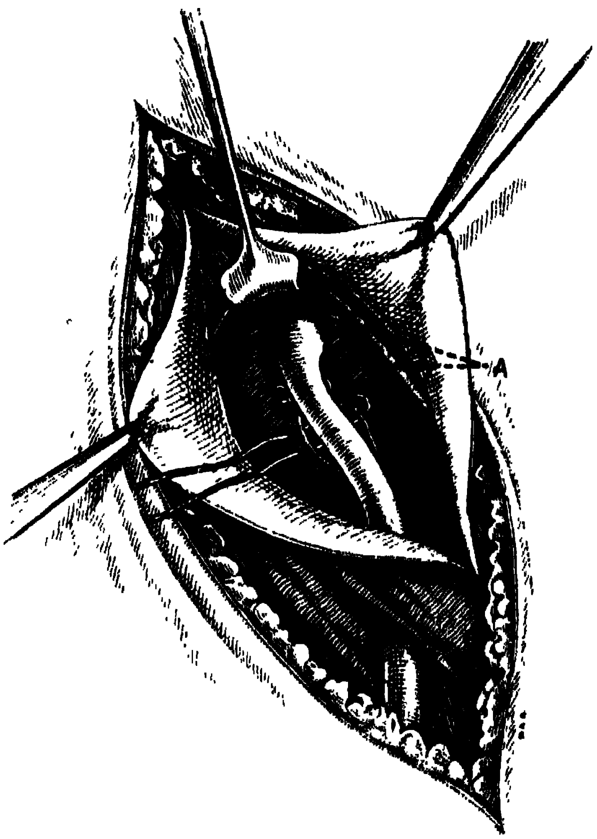

Fig. 33.—Repair of internal ring (A) in oblique inguinal hernia (F. G. Connell). (*Re-drawn from 'Surgery, Gynecology and Obstetrics'.*)

W. W. Babcock[4] makes a transverse incision above Poupart's ligament to follow the skin creases. The sac is isolated and tied at the neck and the suture drawn through the edge of the rectus, so as to transplant the neck behind that muscle. A couple of stitches are put in to fix the rectus down to the fibrous covering of the pubis, to close Hesselbach's triangle. One or two more unite the rectus to Poupart's ligament, and farther up the internal oblique is sewn to Poupart's ligament. The cord is not transplanted. The lower leaf of the external aponeurosis is then sutured to the edge of the rectus, and the external ring closed by folding the upper leaf of the external oblique down over the lower and suturing. *Figs.* 34–39 show some of the steps of the operation in detail, *Figs.* 34 and 35 showing the method of obliteration of Hesselbach's triangle. In *Fig.* 34 the inner layer of the anterior sheath of the rectus muscle in its lower portion is being sutured to the thick tough ligamentous covering of the posterior superior edge of the pubis, posterior to the spine of the pubis and to Poupart's ligament. The shelving portion of Poupart's ligament with the attached mattress suture that has served to transplant the neck of the hernial sac is shown. In *Fig.* 35 the area of the conjoined tendon has been obliterated by suturing the lateral edge of the lower part of the rectus within its sheath to the strong fibrous covering over the pubic portion of the iliopectineal line in front of the spermatic cord. In its mesial portion the suture line lies posterior to

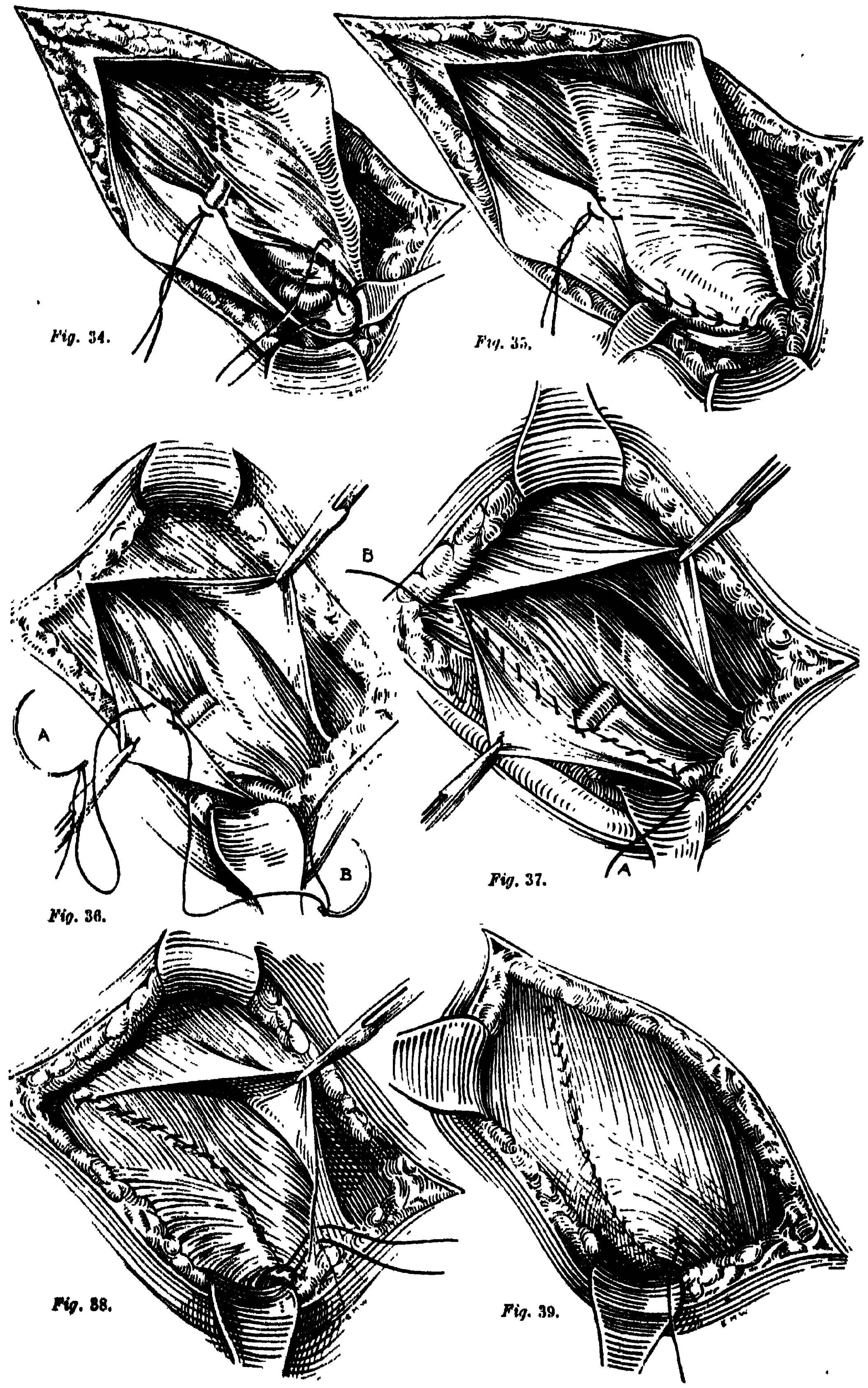

Fig. 34. *Fig.* 35. *Fig.* 36. *Fig.* 37. *Fig.* 38. *Fig.* 39.

Figs. 34–39.—Details of Babcock's operation for inguinal hernia. (*Re-drawn from 'Surgery, Gynecology, and Obstetrics'.*)

the spine of the pubis, to the triangular fascia (ligament of Colles or ligamentum inguinale reflexum). Laterally the suture line is posterior to Gimbernat's ligament and to Cooper's ligament. These sutures fold the conjoined tendon and the ligament of Henle (falx inguinale) against the pubic bone and the ascending ramus of the pubis. This union strongly blocks the crural canal from above, preventing femoral hernia, reinforces the weak internal angle of an indirect inguinal hernia, and solves the problem of the radical cure of direct inguinal hernia. Care must be taken that the suture line is not carried so far laterally as to impinge on the femoral vessels. *Fig.* 36 shows the suturing of the internal oblique and transversalis muscles to the shelving portion of Poupart's ligament. The suture ends from the ligation and transplantation of the neck of the inguinal sac, having been carried through the shelving portion of Poupart's ligament from within out, are tied. One suture, A, is continued laterally and upward, uniting the internal oblique and transversalis to the shelving portion of Poupart's ligament. Care must be exercised in order not to injure or compress the iliohypogastric nerve. Suture B is continued medially and downward, uniting the inner layer of the anterior sheath of the rectus to Poupart's ligament. *Fig.* 37 shows the suture of the internal oblique and transversalis muscles to the shelving portion of Poupart's ligament by a continuous suture completed, the ends of the suture being brought through upon the anterior face of Poupart's ligament as shown at A and B. In this case, to prevent undesirable tension, the edge of the rectus has not been closely apposed to Poupart's ligament. Usually the inner half of Poupart's ligament can be apposed and sutured to the edge of the rectus sheath. If this cannot be done without undue tension, the internal oblique and transversalis muscles are sutured to the shelving portion of Poupart's ligament as indicated. With a strong conjoined tendon, the closure of Hesselbach's triangle by suturing the sheath of the rectus to the pubis is unnecessary. *Fig.* 38 shows imbrication of Poupart's ligament by a continuation of one of the sutures. The lower flap of the external oblique aponeurosis, including Poupart's ligament, covers the previous suture line, and is attached to the internal oblique laterally and to the inner layer of the anterior sheath of the rectus mesially. The ends of the suture are now brought through the upper flap of the external oblique at its inner angle and tied. Hesselbach's triangle has now been reinforced by suture lines with imbrication uniting strong aponeurotic structures in these layers. *Fig.* 39 shows the closure of the aponeurosis of the external oblique muscle. The upper edge of the opening through the aponeurosis of the external oblique has been brought down, lapped over Poupart's ligament, and the edge sutured to the fascia lata by a continuation of one of the continuous sutures previously used. The neck of the hernial sac has now been transplanted, and the inguinal canal narrowed and reinforced by four strong layers of tissue with imbrication.

J. E. Paterson[5] extols the use of fascial grafts in difficult cases, especially praising Gallie's darning method. The middle of the thigh is the best place from which to obtain the graft, and it must be free from fat. Some surgeons use a strip of fascia from the coverings of the hernia. A. R. Koontz[6] has operated on 17 cases using preserved strips of ox fascia lata stored in spirit, and thinks well of it. Two suppurated. The end-results are not given in detail, but one recurrence (in a case of ventral hernia) is known. [It is difficult to see what advantage is gained by the use of preserved fascia.—A. R. S.]

Epigastric Fatty Hernia.—Two years ago in the 1927 MEDICAL ANNUAL, p. 225, we referred to the mimicry of gastric ulcer and other visceral disease by this condition. Further evidence is advanced by D. F. Sullivan and L. Antupit.[7]

Diaphragmatic Hernia.—We discussed this condition also two years ago, and several papers have appeared lately which declare that it is not so uncommon as is thought. J. H. Woolsey[8] divides the cases into congenital, acquired, and traumatic. They are often false, that is, without a sac. C. Mayo[9] advises operation by the abdominal route, using an oblique incision along the costal margin. A good deal of difficulty is often experienced in drawing the abdominal viscera out from the hernia orifice on account of the inspiratory suction, but this may be eliminated by inserting a stout rubber tube through the orifice beside the stomach or colon as the case may be. Any omentum packed in the opening may be cut off and left in the chest. The opening can usually be closed. If difficulty arises, the lower ribs may be resected to allow collapse of the chest wall, or the phrenic nerve cut.

A. Schwartz,[10] reporting two cases, one traumatic and the other congenital, admits that he used to advocate the thoraco-diaphragmatic-abdominal route, but has now become a convert to the thoracic mode of access, with resection of a couple of ribs.

P. E. Truesdale[11] gives details of the combined route, with illustrations (*Plates XXIX, XXX*). He has had a successful case. If intestinal obstruction is present, the first step should be a cæcostomy to relieve the acute symptoms. The hernia should then be attacked through the thorax, turning up a flap containing the 7th and 8th ribs. The opening of the diaphragm and peritoneum is only made if this gives inadequate access.

Hernia through the Foramen of Winslow.—J. W. Dewis and R. H. Miller[12] collect from the literature 33 cases, and add another which was operated on but ended fatally. They point out that, before the final obstruction, there may be evidence of previous trouble, with sense of fullness and swelling. When the obstruction develops there may be resistance in the upper abdomen, which may form a definite tumour. If the bowel can be withdrawn from the foramen the patient will probably recover, but this is usually impossible. It may be feasible to get more room by opening the foramen up by incising the peritoneum in front of and above the duodenum and pressing it down, and then freeing the common bile-duct and hepatic artery from the portal vein, so as to loosen them.

Strangulated Hernia in the Aged.—C. Bearse[13] presents a series of twenty-three cases, all over 65, with one of 94, all operated successfully except two. He attributes his good fortune to the use of a local anæsthetic, and to getting the patients up in a chair on the third or fourth day.

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HIP, TUBERCULOSIS OF. (*See* TUBERCULOSIS OF BONES AND JOINTS.)

HIRSCHSPRUNG'S DISEASE.

Reginald Miller, M.D., F.R.C.P.

J. A. Munro Cameron[1] has made a most welcome effort to elucidate the pathogenesis of this obscure condition. The term 'Hirschsprung's disease' is properly kept for such cases of megacolon as develop so early in life as to be dependent on some congenital condition. Strictly speaking, megacolon arising later—as, for instance, in cœliac disease—should not be termed Hirschsprung's disease. Cameron, then, describes in the true cases a pathological lesion to account for the condition. He finds that there is a degeneration and destruction of Auerbach's plexus in the pelvi-rectal sphincter region. This, he thinks, is the result of infection, and may arise very early in life through the infection of the meconium, which in turn infects the bowel wall at this part. The

PLATE XXIX

OPERATION FOR DIAPHRAGMATIC HERNIA

(P. E. Truesdale)

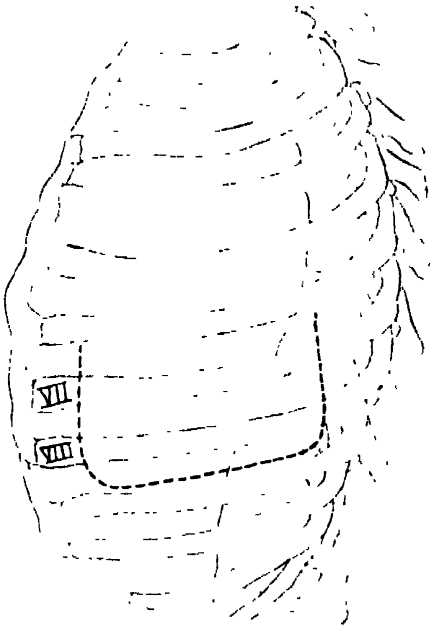
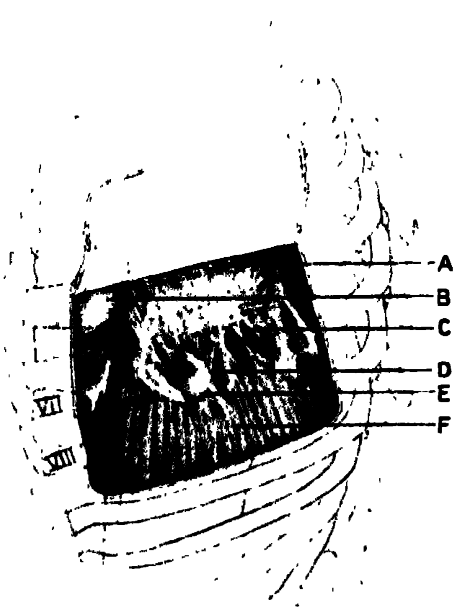


Fig. A.—The dotted line indicates the line of incision, including all layers of the thoracic wall.



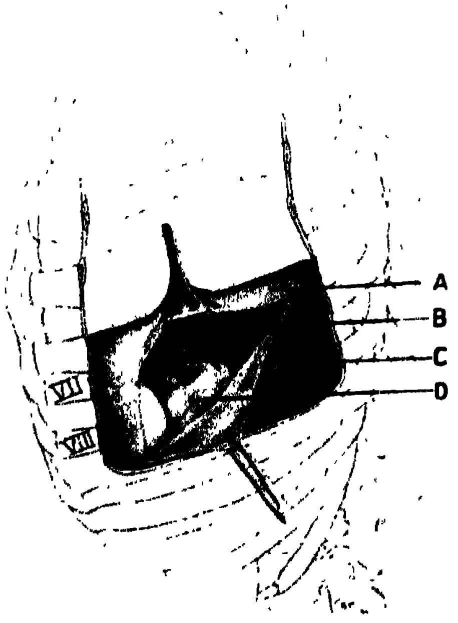


Fig. B.—With the flap turned upward on its base, a large window is provided for dealing with the structures which come plainly into view. **A**, Lung; **B**, Pericardium; **C**, Adhesions; **D**, Colon; **E**, Hernial orifice; **F**, Diaphragm.

Fig. C.—The right-angle incision opens the serous cavities below the diaphragm as well as above it. **A**, Pleura; **B**, Diaphragm; **C**, Peritoneum; **D**, Colon.

Plates XXIX, XXX, re-drawn by kind permission from 'Annals of Surgery'

PLATE XXX

OPERATION FOR DIAPHRAGMATIC HERNIA—*continued*

(P. E. Truesdale)

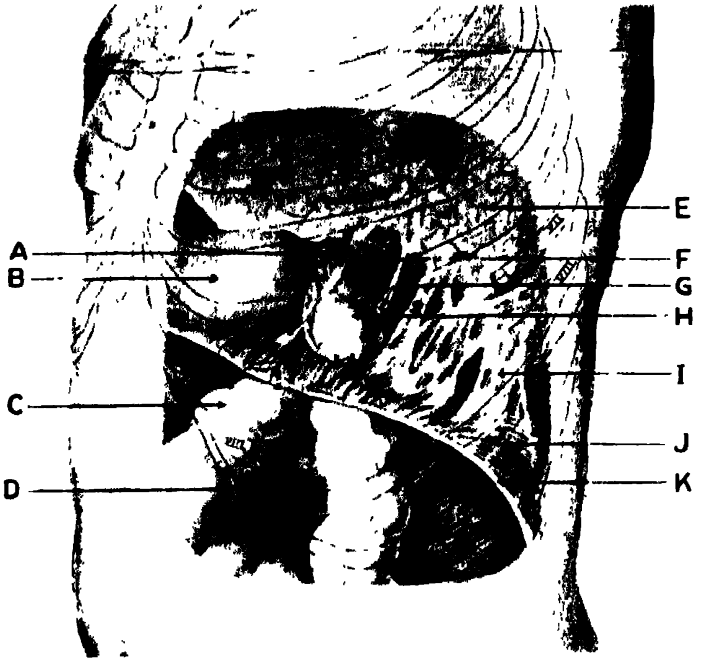


Fig. D.—The section through the diaphragm portrays the conspicuous rôle of the transverse colon and omentum.

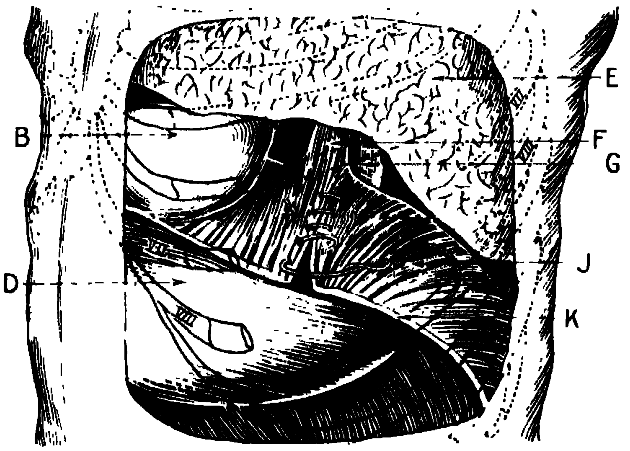


Fig. E.—Aperture repaired by a running suture of chromic catgut, reinforced by mattress sutures of the same material.

A, Omentum; **B**, Pericardium; **C**, Colon; **D**, Stomach; **E**, Lung; **F**, Œsophagus; **G**, Aorta; **H**, Colon; **I**, Adhesions; **J**, Diaphragm; **K**, Cut edge of diaphragm destruction of the nerve-cells causes stasis, and above the affected area the bowel musculature, particularly the circular coat, hypertrophies in order to overcome the difficulty. Of very particular interest is the fact that this brings Hirschsprung's disease into line with cardiospasm, in which, a year earlier, Cameron[2] had described similar changes in the intrinsic nerves of the œsophagus. In fact the reader gathers that it was his researches in cardiospasm which led the author to examine for the same changes in Hirschsprung's disease—a very satisfactory piece of work.

On this pathology, Cameron suggests that the symptoms should yield to **Stretching of the Anal Ring,** but this is a recognized form of treatment. J. Brennemann[3] has recently reported on six cases successfully treated on these lines. Dilatation is the usual method employed in dealing with cardiospasm where of sufficient severity to require treatment.

References.—[1]*Arch. of Dis. in Childhood*, 1928, iii, 210; [2]*Ibid.* 1927, ii, 358; [3]*Jour. Amer. Med. Assoc.* 1927, ii, 662.

HOP-PICKERS AND THE PUBLIC HEALTH.

Joseph Priestley, B.A., M.D., D.P.H.

A recent local focus of small-pox infection in connection with the Kent hop-pickers has again raised the question of the conditions under which such hop-pickers are housed whilst temporarily engaged in picking, and the potential dangers they may be in relation to the spread of infectious diseases, e.g., small-pox, diphtheria, etc. Hop-pickers are drawn from all districts, and consequently are or may be potential agents in the spread of infectious diseases after introduction in the various districts where 'hopping' is a necessity with the employment of *outside* manual labour, the inside supply of pickers not being sufficient for local needs and requirements.

Much is being done by the sanitary authorities concerned for the housing, comfort, and safety of the 'hoppers', but much more still remains to be done before conditions can be described as in any way satisfactory. Vested interests and economical considerations still stand in the way, thereby barring the progress that all admit is absolutely necessary, and many think should be undertaken by a central authority—at least indirectly, if not directly.

By-laws for the proper and sanitary condition of hop-pickers are the first essential, and such by-laws would have to be carried out by the rural district councils concerned, after being adopted in the usual way. Councils of counties would have to co-operate and be prepared to act in the case of inaction by the rural authorities actually responsible. County councils already possess the necessary supervisory powers (including the powers to act in default, when and where required). It must be remembered that 'hopping' is regarded by the prospective 'hoppers' as a good investment—both financially and as a means of their children getting a country holiday. Consequently there is a great rush towards the end of August from such crowded and congested areas as Lambeth, Bermondsey, and Southwark, etc. The rate of pay is such as to ensure each family returning home, after 'hopping', with money in pocket, and health (both of adults and children) much improved. It cannot, therefore, be wondered at that the rush to go 'hopping' is considerable, and the subject is one that requires serious attention, both by the authorities of the districts where 'hopping' is necessary, and by those of the districts (chiefly large towns) from which the 'hoppers' are drawn. The problem is intermittent in that it arises only during the 'hopping' season, but, in view of the numbers of 'hoppers' concerned, is none the less urgent.

Hop-pickers' camps must be sanitary, and the 'hoppers' must be systematically medically inspected. Where temporary huts or houses are provided, they must be sanitary and provided with proper water-supply, w.c. or other accommodation, food storage, refuse disposal appliances, etc. In addition, temporary means for treatment of injuries, sickness, and illness are also required. Further, the danger of hop-pickers to the districts into which they temporarily immigrate must not be forgotten. Diphtheria, small-pox, and typhoid fever may be, and have actually on several occasions been, introduced, causing loss of health and life and considerable expense to the inhabitants. Compulsory registration of hop-pickers' encampments has been suggested, followed by annual licences. Overcrowding and proper separation of the sexes follow on the usual lines and are not necessarily to be dealt with on too arbitrary lines. Suitable cooking arrangements must be provided. The need for the education of the 'hoppers' in sanitary matters goes without saying.

HYDATID DISEASE.

Robert Hutchison, M.D., F.R.C.P.

L. E. Barnett,[1] in discussing the recent advances in our knowledge of hydatid disease, points out that the adult *Tænia echinococcus*, unlike other cestode parasites, is extremely small and may be found sometimes in hundreds among the villi of the upper intestine of an infected dog, and each ripe proglottis as it falls off into the lumen of the bowel carries with it some 500 fertile ova. These are passed in the excrement and adhere to the hair of the dog and thence reach the hands or mouth of anyone handling the animal. This is the commonest mode of infection, though indirect transmission through water or raw vegetables also occurs.

After the ova are swallowed the digestive juices dissolve the chitinous capsules and liberate the contained embryos. These are about the size of megalocytes and are provided with piercing and burrowing implements in the form of three pairs of little specialized spines which enable them to work their way through the mucous membrane of the stomach and duodenum into the richly vascular subjacent tissue where thin-walled and comparatively large radicles of the portal vein are encountered and penetrated. They are then carried in the blood-stream along the portal vein to the capillaries of the liver.

Their further progress is hindered by their size and by their spiny projections, so that they become in large measure filtered out in the hepatic capillaries. Dévé fed young pigs with hydatid ova and found the embryos embedded in the liver within a very few hours after the feeding. Dew, of Melbourne, recently corroborated the findings of Dévé and also reported the discovery of embryos in the portal vein. A proportion of the embryos wriggle their way through the hepatic filter and come to rest in the pulmonary capillaries. Only a few reach the systemic circulation. Clinical observation reveals that approximately 70 per cent of human hydatid cysts occur in the liver, 10 per cent in the lungs, and the remaining 20 per cent in various other parts of the body.

From the embryo under favourable conditions a cyst is developed, and a cyst which reaches the size of a walnut or a hen's egg (some grow as large as a football) is sure to contain myriads of the embryonic tapeworm heads called scolices. These, if swallowed by a dog, develop into adult tape worms, but if they remain in the body of man or any other intermediate host they may undergo a metamorphosis into a new generation of cysts. This used to be stigmatized as a biological heresy, but its common occurrence has been proved absolutely. Daughter cysts endogenously or exogenously situated in regard to the parent parasite can develop from scolices. If the parent cyst bursts or leaks into the abdominal cavity, the pleural cavity, the pericardial cavity, the interior of the heart, or the great vessels, the extravasated scolices, wherever they lodge, may form secondary cysts. Nearly all abdominal and pelvic cysts other than liver cysts are thus accounted for.

DIAGNOSIS.—The clinical signs are often misleading, and the so-called hydatid 'thrill' is very rarely met with. Exploratory puncture is attended with so many dangers and fallacies as to be universally condemned except when the cyst wall has been actually laid bare in open operation.

Of the laboratory aids which have raised the proportion of correct diagnoses to 80 or even 90 per cent, the two most important are: (1) The skin reaction; (2) The complement-fixation test.

1. *The Skin Reaction of Casoni.*—Two or three drops of hydatid fluid taken from the cyst of a sheep are injected through a fine needle, with the usual aseptic precautions, into the skin of the arm, thigh, or abdominal wall of the patient. If the reaction is positive, that is to say, if the patient is the bearer of a hydatid cyst, the site of inoculation in a few minutes runs through the changes of an urticarial wheal. The white raised patch attains the size of a shirt or trouser button, and is surrounded by a little zone of erythema extending 2 or 3 centimetres out. This is the immediate reaction, and it is followed in twenty-four hours or so by a late reaction which is simply a temporary subcutaneous inflammatory redness and œdema spreading out widely from the puncture and subsiding spontaneously in two or three days. This test has the merit of simplicity and can be carried out by any general practitioner who can obtain the pure antigen required.

2. *The Complement-fixation Test* is similar in principle and technique to the Wassermann test for syphilis, and was brought under the notice of the profession first by Ghedini, then by Imaz-Appathie and Lorentz, and then by Weinberg and Parvu. The antigen recommended is hydatid fluid from a sheep's cyst rich in scolices. With this blood test we are able to corroborate or disprove the findings in the Casoni procedure and can obtain some additional information regarding recurrences or multiple cyst formations; but good laboratory facilities are essential. It is not like the Casoni, a test for the the general practitioner to employ.

Other laboratory investigations, such as the eosinophil count, the precipitin test, and so on, are interesting but inconstant.

C. H. Kellaway[2] describes the technique of these tests in greater detail. Summarizing the knowledge we have gained about them, he says that in the very early stage of hydatid infestation, the stage of the early follicle or small actively growing cyst, the only test which is likely to yield a reaction is the intradermal skin test, which may give the delayed as well as the immediate response. There may also be some eosinophilia. At a later stage when there is a large uncomplicated cyst with intact laminated membrane and thickened adventitia, there is as a rule no eosinophilia; but except in rare cases when the fluid in the cyst is of low antigenic power, both phases of the skin reaction are observed.

Both Dévé and Dew have shown that the formation of daughter cysts is the result of some accident to the cyst. In these cases large quantities of fluid have been absorbed through the adventitia after rupture or injury to the laminated membrane of the mother cyst. Eosinophilia may be present, there may be a reaction to the complement-fixation test, and often a high titre of antibody may be revealed. The Casoni test may for some time after the accident give only an immediate wheal, though later both phases of the skin reaction may be found.

In cases with rupture or suppuration these processes may be quiet, with continued absorption of antigen over long periods, or sudden, giving rise to anti-anaphylactic phenomena due to the outpouring of antigen. Complement-fixation is usually positive and indicates a high titre of circulating antibody. The intradermal test may fail to elicit a reaction, though the appearance of the immediate wheal without any delayed response is the common finding. After some months when the absorption of antigen has greatly decreased, both the immediate and the delayed reactions occur.

Finally, when death of the parasite or cure by operation has occurred, the amount of complement-fixation may be small or there may be no reaction to the test, while the result of the Casoni test is both immediate and delayed for some years, the delayed response usually being lost first.

The Casoni test is of little value in cases in which there is a previous history of hydatid infestation, but invaluable in early and uncomplicated cases. In complicated cysts or in cases where recurrence or residual cysts are suspected, the complement-fixation test is of the greatest value.

The greatest difficulties in interpreting the results of these tests are caused by the frequency of multiple infestation and the occurrence of those fortunately rare cysts whose fluid contents have only very low antigenic powers. In these cases there may be no response to the immunological tests, in the first group owing to complete desensitization and in the second to failure of the production of antibody.

Treatment.—Barnett states that various drugs such as iodides, arsenic, mercury, and antimony preparations have been found useless. Radiotherapy also has not given results that inspire confidence. In many cases the patients get well spontaneously, especially in those cases in which the cyst, situated in the lung, bursts into a bronchus. In many cases the cysts exist in the body for years, even to the end of the patient's days, without producing any ill effects calling for treatment.

Ordinarily **Operation** is the only cure, and the standard sort of technique is to open the cyst, evacuate the parasitic membranes completely, shut off the opening in the cyst from any surrounding cavity such as the abdomen or thorax, and then drain. This is called the operation of Lindemann, or marsupialization. The immediate closure of the cyst after evacuation of the contents, no drain being employed (Bond's operation), has been performed in an increasingly large number of cases of late years and is likely to become the method of election.

A point to be emphasized is the necessity of safeguarding the cut tissues as well as adjacent cavities from scolex contamination, otherwise there is a decided risk of secondary cysts developing in the course of a year or two after operation. Following Dévé's suggestion, many surgeons supplement the routine mechanical swab protection by endeavouring to kill the scolices in the parent cyst by the preliminary injection of a 1 per cent watery solution of **Formalin** after evacuating the hydatid fluid through a trocar. The fluid has to remain inside the cyst at least five minutes, and is not of course effective if daughter cysts are present.

Aspiration or tapping of cysts without preliminary operative exposure is hardly ever done now. It is too dangerous and uncertain.

References.—[1]*Surg. Gynecol. and Obst.* 1927, Aug., 148; [2]*Med. Jour. of Australia* (Suppl.), 1927, Nov. 9, 388.

HYDATID DISEASE OF THE KIDNEY. (*See* Kidney, Surgery of.)

HYDRONEPHROSIS.

Sir John Thomson-Walker, F.R.C.S.

Conservative operations on cases of hydronephrosis are of extreme importance, as the cause of the obstruction in most cases is congenital, and in many the condition is bilateral. W. C. Quinby[1] reports thirteen cases of hydronephrosis "in which the stasis was associated with renal and vascular maldevelopment" treated by some form of **Conservative or Plastic Operation.** The following operations were performed: ligation and section of vascular trunks which appeared to be giving rise to obstruction; longitudinal incision of the uretero-pelvic junction followed by transverse closure; division of the ureter at its junction with the dilated pelvis, followed by re-implantation into another area of the pelvis remote from abnormal vessels; resection of portions of the redundant renal pelvis; division of perirenal and peri-ureteral adhesions; and nephropexy. In several instances a combination of two or more of these procedures was used.

A study of the end-results of these cases leads the writer to consider that the operation which attempts to widen the uretero-pelvic junction by transverse suture of a longitudinal incision has not been followed by permanent relief. This type of operation is best adapted to the relief of a stricture at the site of incision, and in none of the cases under review was a stricture demonstrated in the uretero-pelvic region. Free transplantation of the upper cut end of the ureter into a lower position in the dilated pelvis has been followed by uniformly successful results in the seven cases in which this operation was performed. By this procedure the ureter is so placed as to ensure dependent drainage and to be entirely free from contact with any aberrant vessel. In no less than ten cases in the series reported, hydronephrosis was associated with one or more abnormal arteries, and in two cases it was associated with abnormality of the veins, the arteries being normal.

Marion[2] reports thirteen cases operated upon by Papin as illustrative of the value of conservative surgical methods in cases of congenital hydronephrosis when combined with nephropexy. These operations include resections of the renal pelvis, partial resections of the kidney, limited nephrotomy followed by dilatation of a calix, and plastic operations on the renal pelvis and upper part of the ureter. In every case nephropexy was also performed. The writer states that many cases of congenital hydronephrosis have but little actual dilatation, and it is important to recognize that it is only by pyelography that they can be diagnosed.

The important part played by the presence of abnormal vessels in the pathology of hydronephrosis is demonstrated by a series of twelve cases collected by B. Fey.[3]

REFERENCES. [1]*Jour. Amer. Med. Assoc.* 1927, ii, 841; [2]*Bull. et Mém. Soc. nat. de Chir.* 1928, April 7, 500; [3]*Ibid.* March 17, 383.

HYPERPIESIA, HYPERTENSION. (*See* BLOOD-PRESSURE, HIGH.)

HYPOPYON ULCER. (*See* CORNEA, DISEASES OF.)

HYPOTENSION. (*See* BLOOD-PRESSURE, LOW.)

IMMUNITY, ARTIFICIAL, AGAINST INFECTIOUS DISEASES. (*See* INFECTIOUS DISEASES.)

INCONTINENCE OF URINE. (*See* ENURESIS; URETHRA, DISEASES OF.)

INFANT FEEDING, LACTIC ACID MILK IN.

Reginald Miller, M.D., F.R.C.P.

A potent cause of dyspepsia in infants fed on cow's milk is, it is thought, the depression of the H-ion content of the gastric juice. This not only lowers the bactericidal power of the stomach contents, thus favouring the development of enteritis, but impedes, if it does not altogether inhibit, peptic digestion, and allows the passage of unchanged protein through the pylorus. Normal H-ion concentration can be maintained by diluting the cow's milk; but although this procedure is widely practised and answers very well in many cases, there is a proportion of children who do not thrive on milk-and-water mixtures, and the existence of this group has suggested the possibility of overcoming the disadvantages of cow's milk in some other way. The obvious method is the addition of acid in suitable proportion to the whole milk, and various acids have been tried for the purpose, including hydrochloric, lactic, citric, acetic, and 'souring' by the introduction of *B. acidophilus.* While hydrochloric acid would appear the most suitable, it presents several drawbacks, and for practical purposes lactic acid has proved the most satisfactory. It is an organic acid naturally occurring in the course of metabolism, and it is thought not to have the adverse effect on calcium retention attributed to hydrochloric acid, while it is more easily prepared than acidophilus milk. The preparation of lactic acid milk is in theory simple; but in practice considerable difficulty may be experienced in overcoming the tendency to curdle. The addition of 1½ drachms of B.P. lactic acid to a quart of milk produces a suitable concentration (0·5 per cent), and the supply for the whole twenty-four hours may be made at a time, as the mixture keeps well. The acid must be dropped slowly into the cold milk and very thoroughly stirred in; sugar may be added afterwards as required.

In a series of fifty unselected cases in an Infant Welfare Home, J. A. Stephen and E. R. C. Walker[1] found the results obtained from the routine use of lactic acid milk compared favourably with those obtained on ordinary milk dilutions. Their cases included babies of all ages up to six months, the youngest being one day old. They conclude that it can be satisfactorily used in all cases except those of anhydræmia and acidosis; L. G. Parsons,[2] on the other hand, does not advocate its use in children under the age of three months. The principal indications for the use of lactic acid milk would seem to be in some cases of diarrhœa, and in weakly or marasmic infants in whom it is desirable to lighten the task of digestion as much as possible without increasing the volume of the stomach contents. In cases of this type there is no doubt that it is sometimes of great value.

References.—[1]*Lancet,* 1927, ii, 63; [2]*Ibid.* 35.

INFANTILE PARALYSIS. (*See* Poliomyelitis, Acute.)

INFECTIOUS DISEASES, ARTIFICIAL IMMUNITY AGAINST.

Joseph Priestley, B.A., M.D., D.P.H.

With regard to diphtheria and the Schick test and treatment, all experts are agreed as to their great values. With regard to similar lines of treatment, most experts are also agreed in connection with scarlet fever (the Dick test and immunization treatment) and measles (convalescent sera). A recent article by Guy Bousfield[1] sums up the present position of diphtheria to date. Diphtheria immunization is not only safe, but efficient. With this statement all competent experts will agree. Another statement, which is now accepted, is that a *negative* bacteriological examination means nothing; a *positive* one, everything. In other words, a declared *negative* result of bacteriological examination may be in connection with a serious case of genuine diphtheria. The method of taking the swab may be at fault, or its subsequent bacteriological examination; the attack of diphtheria may be laryngeal and not pharyngeal, or may be complicated with the presence of other germs, e.g., Vincent's angina, staphylococcus, streptococcus, pneumococcus, etc.—the diphtheria germ being 'diluted' or 'crowded out', from the point of view of its discovery by the usual methods employed. In other words, antitoxin is indicated in all *doubtful* cases, equally as it is in all proved cases. The whole value of antitoxin treatment depends upon such treatment being carried out in the very earliest stages of the disease. Finally, all diphtheria germs are not necessarily virulent when found. With these acknowledged difficulties, it is clear that something more is necessary for the prevention and treatment of diphtheria. Safe diphtheria immunization is now proved to be scientifically correct, and, consequently, the Schick test must be acknowledged as well as the after-immunization. The toxoid-antitoxin mixture is perfectly safe. The *Practitioner* article states that "no child who has been through a complete course of immunization has died of diphtheria in an experience covering some thousands of cases". What more can be said? Schickism is certainly justified.

What applies to diphtheria applies, on similar lines, to scarlet fever and measles, and much valuable work is being carried out in respect of these two latter diseases—measles (convalescent) serum being experimented with by Manchester at the Monsall Fever Hospital. With regard to measles, unfortunately the specific germ has not yet been isolated, so that experiments are confined to convalescent sera from human cases; and the same remarks apply also to scarlet fever, in view of the large number of experts who are not prepared, as yet, to accept the *Streptococcus scarlatinæ* as the *causa causans* of this particular disease. Undoubtedly, *acquired immunity* is a most valuable preventive measure in Public Health administration even at the present day, but nothing in value compared with what it will be, even in the near future.

REFERENCE.—[1]*Practitioner*, 1928, Oct.,

INFECTIOUS DISEASES, SCHOOL CLOSURE FOR. (*See* SCHOOL OFFICIAL CLOSURE.)

INFLUENZA.

J. D. Rolleston, M.D.

EPIDEMIOLOGY.—T. Reh[1] states that the epidemic of influenza which broke out in Europe in December, 1926, was characterized in Switzerland by its mildness, its high incidence, and by the fatalities being almost entirely confined to elderly persons. The morbidity and mortality were higher in women than in men. The chief cause of death was influenzal pneumonia, which was usually associated with the chronic affections of old age such as arteriosclerosis, myocarditis, Bright's disease, and senility. Influenzal septicæmia and meningoencephalitis were exceptional.

ETIOLOGY.—G. Baize[2] distinguishes the following two varieties of influenza: (1) True or essential influenza caused by a filtrable virus, probably *B. pneumosintes* of Olitsky and Gates, representing an extremely contagious disease, occurring in pandemics at more or less distant intervals. Bronchopulmonary forms are extremely frequent and severe, and convalescence is protracted. (2) Various ill-determined affections such as rhinopharyngitis, laryngo-tracheitis, ordinary colds, and catarrhal sore throats, which are improperly called influenza. This group differs from true influenza in not having an epidemic character and being much less contagious. It is due to non-specific organisms localized in the respiratory tract. Complications are rare and recovery is usually rapid.

During an epidemic of influenza at Milan in the autumn and winter of 1925–6 in which a large number of children were attacked, G. Taccone[3] carried out investigations for Pfeiffer's bacillus with the following results: (1) Pfeiffer's bacillus was found in direct smears of the pharyngeal mucus or sputum in 3 out of 15 children with uncomplicated attacks, in 3 out of 10 with lung complications, in 1 out of 6 convalescents, and in 1 out of 3 cases of suppurative arthritis. (2) Pfeiffer's bacillus was found in cultures in 20 per cent of the specimens of pharyngeal mucus, in 4 out of 12 specimens of urine, and in 1 case of suppurative arthritis in association with the pneumococcus. (3) Blood cultures were constantly negative. Among 14 cases examined, the pneumococcus was found twice and an organism resembling Pfeiffer's bacillus once. (4) A similar result was obtained from cultivation of the cerebrospinal fluid, the pneumococcus being present in only one case in which well-marked changes were found in the fluid. (5) In 13 out of 21 cases tested, specific agglutinins were found in dilutions ranging from 1–10 to 1–250 both in the acute stage and in convalescence. (6) Only a very slight disturbance was produced in animals by injection of various strains of Pfeiffer's bacillus. No definite conclusions therefore could be drawn as to the causal agency of Pfeiffer's bacillus in the epidemic.

SYMPTOMS AND COMPLICATIONS.—Z. von Barabás,[4] discussing the *effect of influenza on other diseases*, states that in his experience tuberculosis does not afford any protection against influenza, as twelve tuberculous children in a home all contracted the disease. The attacks, however, were mild, even in those with active tuberculosis, and no aggravation of the pulmonary condition could subsequently be attributed to the acute infection. On the other hand, influenza was always found to have an unfavourable effect on other infectious diseases, especially measles, scarlet fever, and diphtheria, and the febrile condition associated with these diseases did not confer any immunity against influenza.

R. Gaeta[5] states that many children under observation who had escaped influenza in 1926 contracted the disease towards the end of May and in June, 1927, and always in the form of *lobar pneumonia* with special predilection for one or both apices. Examination of the sputum showed the presence of Pfeiffer's bacillus associated with Fraenkel's diplococcus and other organisms. The influenza bacillus thus shows the same tendency to attack the pulmonary apices as does the tubercle bacillus. Influenza, therefore, like measles and whooping-cough, may be regarded as a pre-eminently tuberculogenic disease.

A. Rigaud,[6] who records five cases in patients from 23 to 36 years of age, states that *acute œdematous laryngitis* in influenza may present all degrees of severity, its intensity ranging from a slight interference with respiration to asphyxia requiring tracheotomy. The general symptoms are very variable, the only constant one being a high temperature. The diagnosis can only be made by exclusion of all other causes of laryngeal dyspnœa. There is no specific treatment, but palliative measures, intubation, or tracheotomy must be employed as required.

According to P. Vachey,[7] *influenzal otitis* is characterized by its sudden onset and violent pain. Two subsequent stages may be described. The first is one of hyperæmia manifested by a diminution of hearing and a sense of fullness in the ear. When the condition becomes worse the patient complains of a dull continuous pain in the ear radiating to the temporal region. The tympanic membrane is seen to be of a uniformly dark-red colour, and sometimes the ossicles cannot be distinguished. Hæmorrhages may develop and give rise to the appearance of hæmorrhagic vesicles on the membrane and walls of the external auditory meatus. The hyperæmic stage is usually followed, unless paracentesis is performed, by a stage of exudation in which there is an effusion into the middle ear causing pressure on the membrane and walls of the tympanum and giving rise to severe and continuous pain. On examination the membrane is seen to be œdematous and bulging into the meatus. Paracentesis is followed by a discharge of blood-stained pus and relief of the pain. In rare cases influenzal otitis is purulent from the first. In addition to the form which runs its course in two stages is one ushered in by severe constitutional disturbance and affection of hearing. Hæmorrhagic vesicles are seen to cover a more or less considerable part of the tympanic membrane, the rest of which remains normal. There are also numerous vesicles in the meatus, the lumen of which is sometimes completely blocked. The mastoid becomes tender on pressure at an early stage. The most characteristic feature, however, of this form of otitis is the rapid disappearance of the alarming initial signs in the absence of any treatment or after applications to the nasal fossæ, nasopharynx, and external auditory meatus.

In a paper on the *renal complications* of influenza, Q. Celli[8] states that slight albuminuria is the rule in influenza and its absence is exceptional. Severe renal lesions on the other hand, though they do occur, are not at all frequent. Their prognosis is generally good, and they rarely become chronic in previously healthy subjects. As regards the pathogenesis of these renal changes the toxic factor should be considered most important, though in certain cases the microbial factor cannot be excluded. Influenzal nephritis and nephrosis do not present any special features to distinguish them from renal lesions due to other causes.

REFERENCES.—[1]*Rev. méd. de la Suisse Rom.* 1927, 399; [2]*Gaz. des Hôp.* 1928, 421; [3]*Clinica Pediatrica*, 1927, 659; [4]*Arch. f. Kinderh.* 1928, lxxxiii, 257; [5]*Policlinico (Sez. Prat.)*, 1927, 1318; [6]*Thèse de Paris*, 1927, No. 107; [7]*Ibid.* No. 260; [8]*Morgagni*, 1928, 41.

INTESTINAL OBSTRUCTION IN INFANCY AND CHILDHOOD. (*See also* INTESTINES, SURGERY OF.)

John Fraser, Ch.M., F.R.C.S.Ed.

The above was the subject of an exhaustive communication by A. Maclennan[1] at the meeting of the British Medical Association in July, 1927. It was pointed out that the symptomatology in children was similar to that met with in adults, but it was indicated that the prognosis was less serious, except in those cases in which a congenital error rendered remedial procedures difficult and sometimes impossible.

The importance of **Preliminary Lavage** was recognized. In localizing the site of the obstruction, the author avoids distended bowel; he isolates a loop of collapsed intestine and proceeds to follow this centrally until the lesion is discovered. Having located the error, he overcomes the obstruction by such manœuvres as **Lateral Anastomosis** or **Enterostomy**. It was maintained that the latter is a satisfactory operation in a child if the intestinal fistula is made through overlying omentum. No comment was made on the question of lateral anastomosis, but the risk of such a procedure in the presence of an acute obstructive process is universally recognized.

The matter of *anæsthesia* was considered. Chloroform does not receive from Maclennan the condemnation which many accord to it. He recognizes its peculiar power to ensure muscular relaxation, and, while the majority hold that the risks of acidosis greatly outweigh any relaxation advantage, Maclennan replies that acute intestinal obstruction is associated with an alkalosis, and that therefore any degree of acidosis which may result from the chloroform anæsthesia is salutary. This conception is interesting, and in our experience original. Maclennan did not tell us the evidence upon which his conclusions are based (we confess that we have associated the toxæmia of intestinal obstruction with a considerable rise in the hydrogen-ion concentration of the blood and body fluid); but so convinced is he of the truth of his argument that he recommends, and apparently practises, the introduction of a pepsin and hydrochloric acid combination in saline into the abdominal cavity in order to counteract the existing (?) alkalosis! The value of glucose as a post-operative measure was questioned, and in this respect the author would seem to be in agreement with Levine and Mickie, who have shown that there is a definite increase in the amount of the post-operative blood-sugar. The recommendation was made to give **Sodium Chloride** in excess post-operatively, for the reason that it is already a deficient element in the body tissues, and that when given in bulk it has a distinctly antagonizing effect upon the toxic contents of the intestine.

Reference.—[1]*Brit. Med. Jour.* 1927, ii, 818.

INTESTINE, SPONTANEOUS RUPTURE OF, IN THE NEWBORN.

John Fraser, Ch.M., F.R.C.S.Ed.

It is true that this is a very rare event, but the possibility should be kept in mind when death, evidently proceeding from an abdominal cause, occurs in the newborn child. T. H. Russell[1] records a case, and he has collected twenty-three examples of the condition from the literature. In Russell's case there was a long labour of twenty-one and a half hours with a vertex presentation. There was no history of injury to mother or child. On the second day after birth the child refused to feed, and the following day was sick and cried a great deal. On that day, when admitted to hospital, there were all the signs of peritonitis, and these were confirmed at operation, when a linear tear 1 in. long was found in the head of the cæcum. No definite explanation can be given of the disaster.

Reference. [1]*Jour. Amer. Med. Assoc.* 1928, i, 1431.

INTESTINES, SURGERY OF.

A. Rendle Short, M.D., F.R.C.S.

Technique of Intestinal Anastomosis.—A method of aseptic intestinal anastomosis that can be relied upon to leave no diaphragm inside, as is well shown by photographs of actual results, is described by F. W. Rankin,[1] of the Mayo Clinic. It depends upon the use of a special clamp (*Fig.* 40). It is equally suitable for end-to-end unions of the large bowel, or for end-to-side unions of the large or small intestine. There is a central blade against which the two side blades operate independently. Hæmostasis is secured by the crushing of

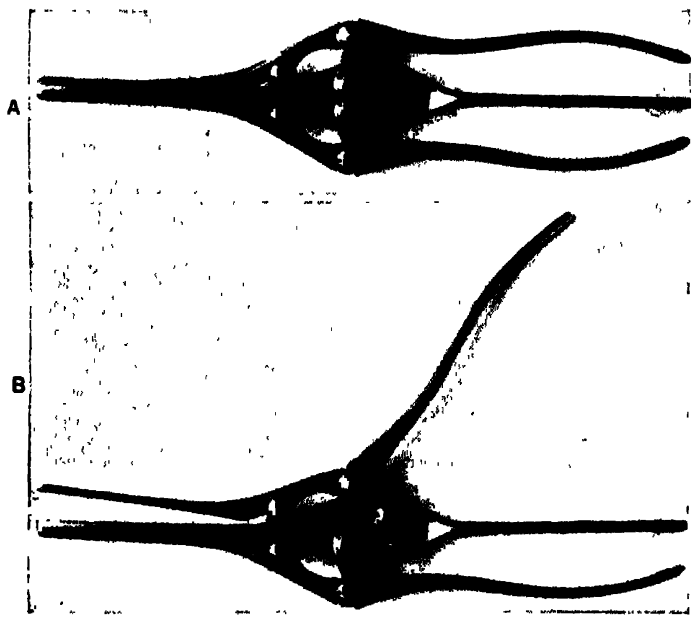


Fig. 40.—Rankin's clamp for intestinal anastomosis. A, Clamp closed, bladed. The depth in this position is 8 mm.; length over all 22·5 cm., each blade being 7·5 cm. long. The central blade is 0·5 cm. in width and 3 mm. in depth. B, Clamp with one blade closed and the other open for the reception of the bowel. (*By kind permission of 'Surgery, Gynecology and Obstetrics'.*)

the bowel wall by the clamp, and the division by cautery. [This is a weak point. It is well proved that serious bleeding can take place after these procedures.—A. R. S.] It will be seen that for an end-to-side anastomosis between the ileum and colon, the ileum is first clamped and divided; then a length of colon is nipped up with the other blade, and opened by running the cautery along the blade. The three blades now hold the two openings in the intestine close together. The clamp is turned over, and the posterior suture line inserted. Then the clamp is turned back again, and the anterior suture line put in. The clamp can now be taken off and the sutures

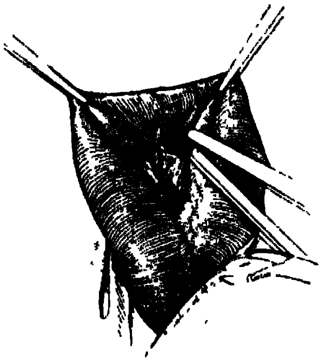


Fig. 41.—Application of clamp to ileum. The blood supply in the mesentery has been tied off and the clamp is applied at an angle so as to obtain a wider lumen for the anastomosis. The bowel is divided with cautery.

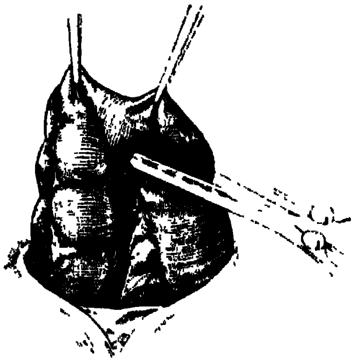


Fig. 42.—The clamp being applied to a point selected on the transverse colon for the colonic end of the anastomosis.

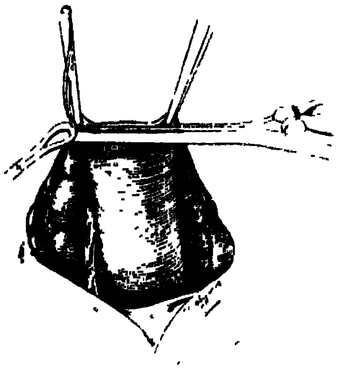


Fig. 43.—An elliptical portion of the colon is being removed by cautery to make an opening in its lumen, and the small bowel is shown approximated at this point.

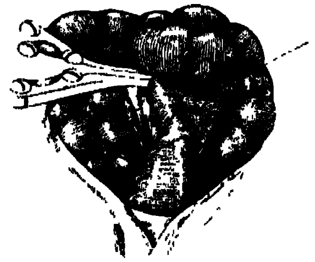


Fig. 44.—Posterior layer of sutures being applied in end-to-side anastomosis. The clamp is turned over.

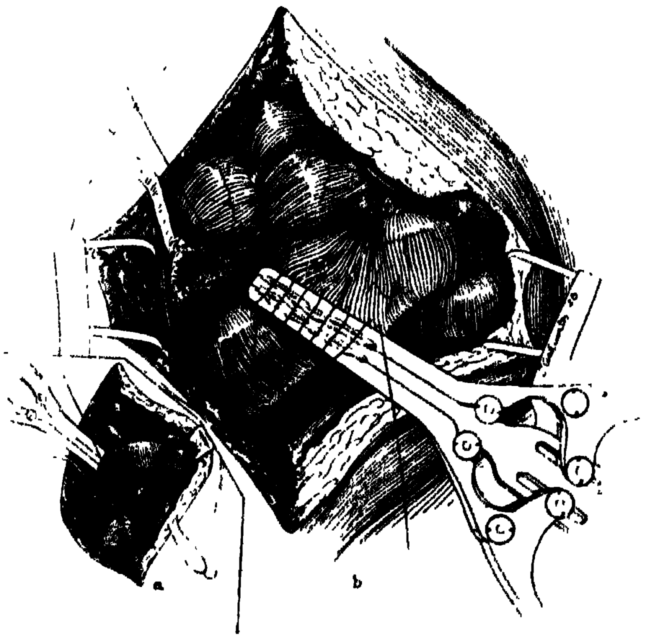


Fig. 45.—Ileocolostomy over a clamp. **a**, Posterior layer of sutures anastomosing the ileum and transverse colon. **b**, Anterior layer of sutures.

tightened; then a second layer of stitches is inserted all round the whole anastomosis. Finally a finger is invaginated through the bowel wall into the anastomosis to break down the agglutination of the surfaces that the clamp has crushed together, and so to restore the lumen. For end-to-end union of the colon, the mode of employment is similar, as a study of *Figs.* 41–51 will make clear.

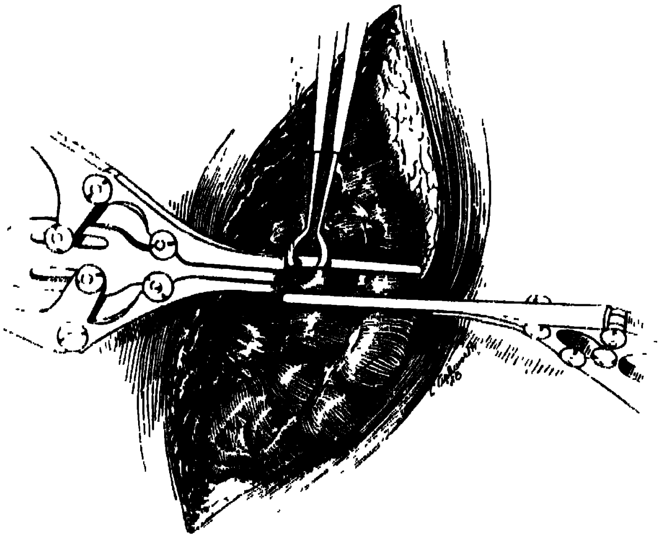


Fig. 46.—Division of bowel proximal to the growth, one limb of the clamp holding the end to be anastomosed, the other limb shown closed.

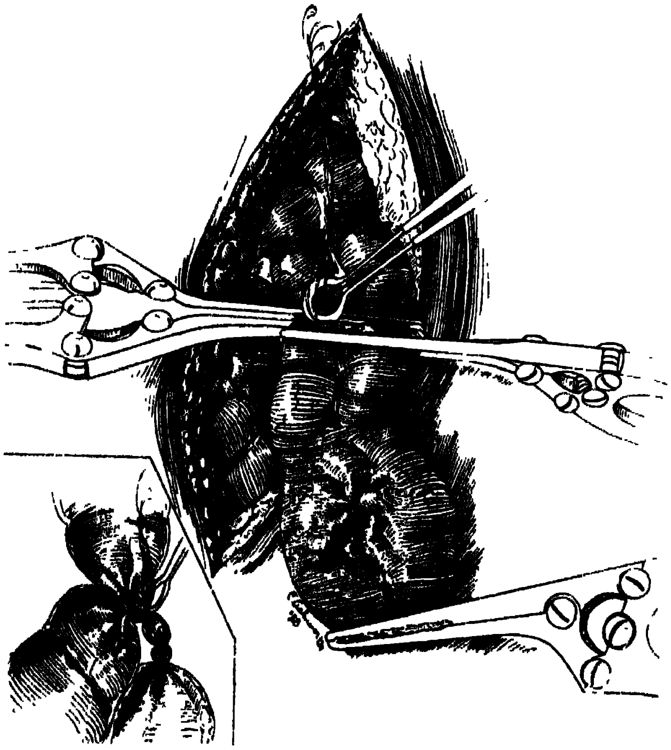


Fig. 47.—Resection is being completed with cautery. Both arms of the bowel are caught with the clamp and the section is shown being removed.

Intestinal Obstruction.—Several papers appear on the metabolic changes that occur in this condition, and which may be the cause of death. R. Rockwood

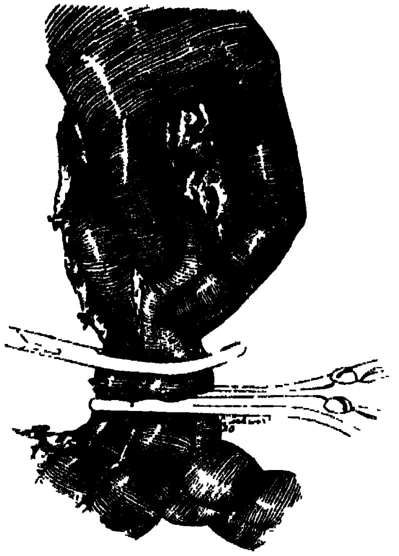


Fig. 48.—Segment ready for removal with cautery. One clamp above the anastomosis line catches both limbs of the bowel to be removed.

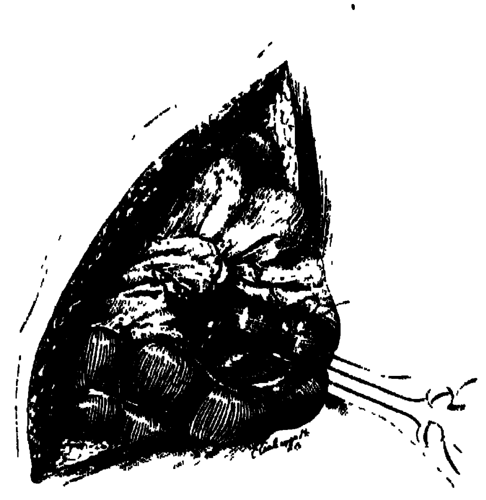


Fig. 49.—The first layer of sutures is being applied posteriorly. Clamp is rotated laterally and a continuous catgut suture approximates the peritoneal coats of the bowel on the posterior side. This suture extends half-way across the bowel.

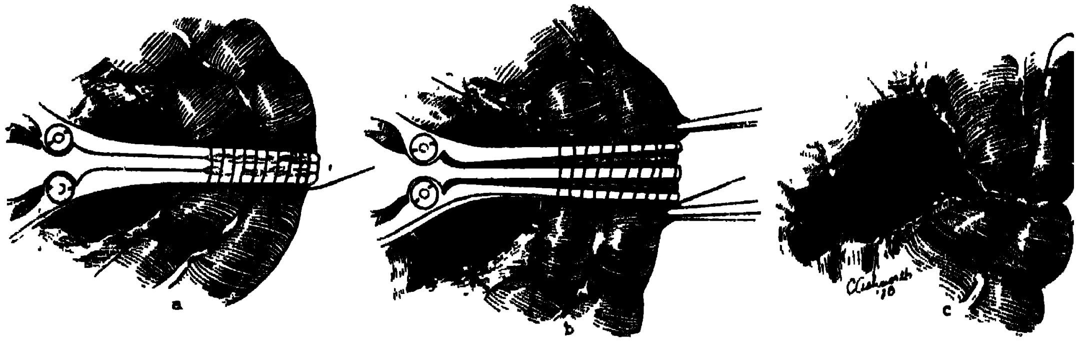


Fig. 50.—End-to-end anastomosis over clamp. Resection has been made. **a**, Suture applied on anterior side of the bowel with continuous peritoneal stitch. **b**, Clamp unlocked ready to be withdrawn, after which the suture will be drawn taut, inverting the end of the bowel. **c**, Completed operation and final row of sutures being put around the anastomosis.

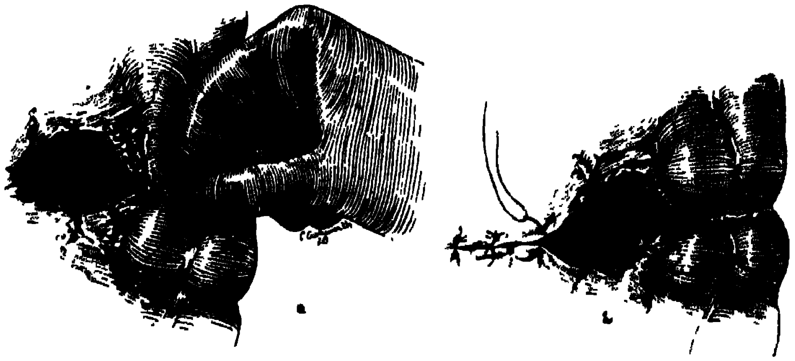


Fig. 51.—**a**, The fingers introduced through the anastomosis to break up the agglutination which forms a diaphragm. **b**, The operation is completed with two layers of sutures. Closure of the rent in the mesentery is made with interrupted catgut sutures.

and R. S. Anderson[2] confirm the observations of Haden and Orr and others, that in severe cases of obstruction or toxæmia the blood chlorides are reduced, and that giving plenty of fluids and also the intravenous injection of 5 per cent **Sodium Chloride,** about 500 c.c. a day, may be of great assistance. A. Gosset, L. Binet, and D. Petit-Dutaillis[3] endorse this opinion of the value of giving hypertonic saline. W. D. Gatch, H. M. Trusler, and K. D. Ayres[4] draw a distinction between simple obstruction high up—when death is due to dehydration, loss of chlorides, and starvation—and strangulation—which gives rise to fatal toxæmia, the toxin being a proteolytic product acting like histamine. The former can be met by introducing water and chlorides; the latter is inevitably fatal if by lapse of time a lethal dose of toxin has been absorbed. R. St. L. Brockman,[5] in his Arris and Gale lectures, has worked out quite a novel line, starting from Whipple's well-known experiment, in which if a loop of duodenum is excluded by tying both ends, and the continuity of the alimentary canal restored by a gastrojejunostomy, the dogs always die with symptoms of acute toxæmia within a day or two, whereas if the loop is in the ileum they live for many days. Brockman argues that the fatality cannot be due to bacteria, because the duodenum is much less laden with germs than the ileum. He therefore, in place of a gastrojejunostomy to restore continuity, made an anastomosis between the proximal part of the duodenum above the ligature and the jejunum. The dogs were alive and not suffering from toxæmia on the third day, and one lived till the tenth. The difference is that the bile could under these circumstances obtain access to the intestines, whereas after Whipple's procedure it could not. Again, it is well known, both by clinical and experimental evidence, that a pyloric obstruction is compatible with a relatively long survival, but a block just below the entrance of the bile-duct is rapidly fatal. Conceiving, therefore, that the toxæmia of intestinal obstruction is due to lack of bile in the intestine, Brockman administered fresh **Human Fistula Bile** per rectum in cases of obstruction with toxæmia, and found great benefit. Ox bile is not effectual, and causes severe pain.

The *diagnosis* of obstruction of the jejunum in doubtful cases may be made by X rays. H. H. Kalbfleisch[6] gives illustrations of the distended duodenum and upper jejunum with an air-bubble above the horizontal fluid level. The patient must be standing to show this.

In the *treatment* of intestinal obstruction, the value of **Jejunostomy** when the cause is a temporary one as in pelvic peritonitis is written up by H. M. Clute[7]; and that of **Ileocolostomy** (not ileo-ileostomy) in cases of longer duration where the obstruction cannot be removed at once is advocated by J. Taylor,[8] of Dundee. Both procedures are now well known and firmly established.

It is well known that an evacuation of paralytic bowel can generally be secured by giving an **Intraspinal Anæsthetic.** A. Ochsner, I. M. Gage, and R. A. Cutting[9] point out that in animals the same effect may be obtained more safely by splanchnic anæsthesia instead of spinal.

Intussusception.—A very successful series is reported by H. Chitty,[10] of Bristol, who saved 33 out of 36 cases operated on. Two of the fatal cases required resection. No unusual methods were employed.

Volvulus.—Discussing this supposedly common, but really rather rare, condition, Garnett Wright[11] points out that it is usually a chronic rotation of the colon ending acutely. A careful history will as a rule elicit the fact that there have been vague colicky pains for a good while, with occasional copious stools or passage of much offensive flatus. These are no doubt due to slight degrees of twisting. Finally acute strangulation supervenes and the blood-supply is endangered. A barium enema may show the chronic volvulus before this disaster occurs. The best treatment for acute volvulus is **Resection** of the affected loop and a **Double-ended Colostomy** with Paul's tubes.

J. P. Pratt and L. S. Fallis[12] give illustrations of cases of volvulus of

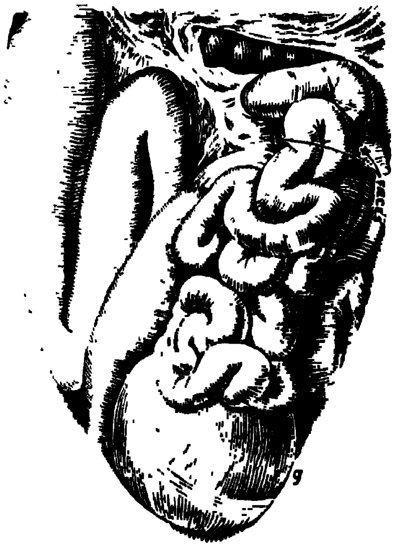


Fig. 52.—Small intestine lying across the ascending colon, adding to the obstruction caused by torsion *Figs.* 52, 53 show the same case.

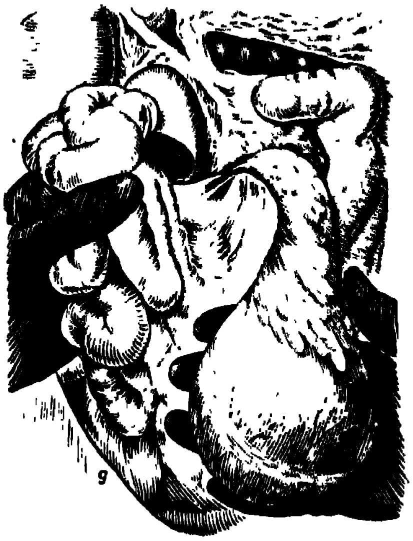


Fig. 53.- First step in reduction of the obstruction. The small bowel is removed from its position of pressure on the ascending colon. The colon is rotated 360°.

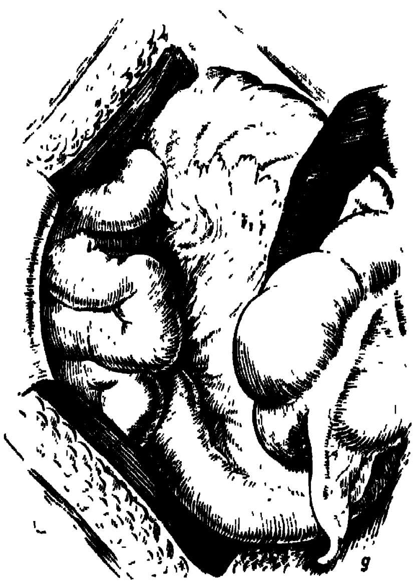


Fig. 54.—The ileum entering the cæcum from the right; the small bowel is all on the right side of the abdomen. *Figs.* 54, 55 show the same case.

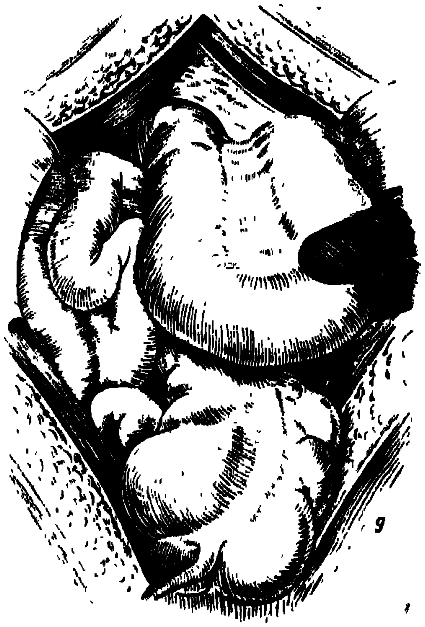


Fig. 55.—The peculiar U-shaped loop of the transverse colon, which is characteristic of the maldevelopment in which the large bowel remains on the left side of the abdomen.

(Figs. 52–55 re-drawn from the 'Journal of the American Medical Association')

the cæcum and ascending colon (***Figs.* 52–55**). They had three cases, two of which recovered after detorsion, and one died. The successful cases were subsequently treated by colopexy of the ascending colon to prevent recurrence.

J. Hagen-Torn,[13] of Leningrad, endeavours to avert recurrence in patients with volvulus of the sigmoid by plication of the mesosigmoid. He inserts three or four stitches in the axis of the mesosigmoid, through both laminæ, and draws them tight so as to shorten both the sigmoid and the mesosigmoid "like reefing a sail". The manœuvre was used successfully in 7 cases.

(*See also* INTESTINAL OBSTRUCTION IN INFANCY AND CHILDHOOD.)

REFERENCES.– [1] *Surg. Gynecol. and Obst.* 1928, July, 78; [2] *Ibid.* 1928, March, 352; [3] *Presse méd.* 1928, Jan. 7, 17; [4] *Surg. Gynecol. and Obst.* 1928, March, 332; [5] *Lancet*, 1927, ii, 317; [6] *Amer. Jour. Med. Sci.* 1927, Oct., 500; [7] *New England Jour. of Med.* 1928, June, 908; [8] *Edin. Med. Jour.* 1927, Dec., 727; [9] *Jour. Amer. Med. Assoc.* 1928, i, 1848; [10] *Bristol Med.-Chir. Jour.* 1928, Spring, 51; [11] *Brit. Med. Jour.* 1928, i, 712; [12] *Jour. Amer. Med. Assoc.* 1927, ii, 1225; [13] *Zentralb. f. Chir.* 1927, Sept. 3, 2284.

INTRACRANIAL PRESSURE.

Sir James Purves-Stewart, K.C.M.G., C.B., F.R.C.P.

Treatment by Hypertonic Solutions.—In the adult the skull is a rigid bony box incapable of expansion. The total volume of the intracranial contents—brain, cerebrospinal fluid, and blood—being constant, it is obvious that increase in the volume of any one of these three components can only occur at the expense of one or both of the others. If, therefore, the brain becomes swollen, e.g., by the presence of a tumour, a corresponding decrease must occur in the volume of the cerebrospinal fluid or of the blood, or both. Such readjustments almost always raise the intracranial pressure.

The most obvious way to reduce raised intracranial pressure is to make an opening in the rigid skull and dura by performing a decompressive operation. Until recently this was the only procedure available, and even now it is the method of election in certain cases. There are, however, a number of conditions of increased intracranial pressure in which efficient relief can be obtained without craniectomy, by the employment of hypertonic solutions. These can be used sometimes as a substitute and sometimes to supplement craniectomy.

Russell Brain[1] contributes an interesting article on the subject. Weed was the first observer to point out that hypertonic solutions can be used to lower the intracranial pressure. On injecting intravenously in animals a concentrated solution of sodium chloride, he demonstrated that the pressure of the cerebrospinal fluid promptly fell to a marked degree. If part of the skull were first removed, shrinkage of the brain could be seen to follow such intravenous injection. The reason for this is that the excess of salts in the blood leads to reabsorption of water from the brain into the blood-stream. The cerebrospinal fluid therefore becomes reabsorbed from the perivascular spaces into the cerebral capillaries; consequently the brain diminishes in volume and the intracranial pressure falls to a marked degree. It was soon found by other workers that the same results could be achieved by administering hypertonic solutions by way of the intestinal canal. These withdraw water into the intestine, thereby raising the osmotic tension of the blood, which promptly recoups itself by dehydrating all the tissues and organs, including the brain.

Hypertonic solutions can be administered in various ways:—

1. *Intravenous Injection.*—This is the method chosen when we desire to lower the intracranial pressure as rapidly as possible. The most convenient solution for intravenous use is a sterile solution of **Sodium Chloride** in distilled water. The maximal dose is 100 c.c. of a 30 per cent solution. For most purposes, however, this is more than is necessary, and it is enough to give 70 to 100 c.c. of a 15 per cent solution or half these amounts of the 30 per cent solution. Some workers prefer a concentrated solution of **Glucose**, 100 c.c. of a 50 per cent solution in normal saline, claiming that after a glucose injection the fall of intracranial pressure is slower and more sustained, and less likely to be

followed by a reactionary rise, than after the use of sodium chloride. Moreover, glucose has a nutritive value and is of help in combating shock and acidosis. Whether sodium chloride or glucose be employed, the solution should be run into the vein very slowly, at a rate not exceeding 3 c.c. per minute.

2. *Administration by the Mouth.*—To obtain comparable results by oral administration it is necessary to give very large amounts either of **Sodium Chloride** or of **Magnesium Sulphate.** The dose of sodium chloride is 16 grm. (about 4 oz.) given in 2-grm. capsules, washed down with 80 c.c. of water. Magnesium sulphate by the mouth is given as 3 oz. of a 50 per cent solution.

3. *Rectal Administration.*—This is ordinarily the most convenient method of giving hypertonic solutions. The dose is 6 oz. of a 50 per cent solution of magnesium sulphate, slowly run into the rectum at body temperature. Unless it is retained it will not produce its full effect and should be repeated an hour later.

Whichever be the route adopted, since the method operates by dehydration of the tissues, the patient's intake of water must be restricted, in order to secure the full effects. Incidentally, solutions of magnesium sulphate should on no account be given intravenously, for if administered by this route they produce general anæsthesia and respiratory paralysis. Rectal injections, if too frequently repeated, may produce irritation of the rectum.

INDICATIONS FOR EMPLOYMENT.—Let us now consider the chief conditions in which hypertonic solutions are of special value.

Firstly, there is the condition of *unresolved contusion of the brain*, characterized by obstinate paroxysmal *headaches* recurring for many months. Following a head injury of moderate severity, sometimes associated with concussion (e.g., in soldiers blown up by high explosive, or in civilians after falls on the head, as in hunting accidents), there is inveterate headache, localized to the site of contusion, so that the patient feels as if his head were bursting; there may also be localized tenderness on pressure. Anything which increases intracranial tension—e.g., coughing, sneezing, stooping, physical or mental exertion—aggravates the headache. The pain is alleviated by rest: it is usually absent on waking in the morning, but tends to come on by the time the patient has finished dressing and begins to move about. The patient becomes nervous and irritable, and may develop a typical anxiety neurosis. The persistence of these symptoms is explained, as Trotter has shown, by the fact that owing to the inextensibility of its capsule the brain when contused can only undergo compensatory swelling to a very slight extent so as to liberate its circulation from pressure. Thus the process of resolution of extravasated blood and plasma in the brain is specially slow and may be prolonged for weeks or months, since the localized area of œdema due to the contusion becomes surrounded by a zone of impaired circulation, which prevents the removal of the exudate. A vicious circle is thus established which it is the object of treatment to break. Rest is the first essential in such cases, the patient being rigorously confined to bed and not allowed to get up for any purpose. Hypertonic solutions are employed to lower the intracranial pressure and assist in the absorption of the exudate. In mild cases it may be enough to give a drachm of magnesium sulphate three times daily by the mouth, combined perhaps with 10 gr. of potassium bromide. Better still are intravenous injections of hypertonic saline, say 100 c.c. of a 15 per cent sodium chloride solution, repeated if necessary after four or five days. Sometimes a single intravenous injection is enough to relieve the patient from his headache, and he may then be allowed to get up. If medical measures fail, a subtemporal decompression may usually be relied on to relieve the symptoms, but this is hardly ever required if hypertonic solutions have been given a fair trial.

In *recent head injuries*, again, hypertonic solutions have a definite therapeutic value. They can be used as an adjuvant to surgical decompression so as to help in reducing cerebral œdema. In this way they may tide the patient over the critical period when the question of operation hangs in the balance, and so render operation unnecessary. They undoubtedly promote recovery and diminish the risk of sequelæ in the milder cases of cerebral contusion and concussion, in which operation is not indicated. In all cases of severe head injury the intravenous method is preferable, whilst the glucose solution has the special advantage of combating acidosis and shock.

But hypertonic solutions should not be employed in any form if shock is profound, as indicated by subnormal temperature and low blood-pressure and by a rapid and rising pulse-rate.

In *intracranial tumours* the rise of intracranial pressure is brought about by several factors, viz., the direct pressure of the tumour acting as a foreign body, the effect of the tumour on the intracranial circulation, producing local and then general venous congestion, and the combination of these two factors in producing internal hydrocephalus by obstructing the free passage of fluid from the cerebral ventricles. Moreover the increased venous pressure within the brain causes excessive secretion and impaired absorption of cerebrospinal fluid. The value of hypertonic solutions in cases of cerebral tumour consists in the fact that they break these vicious circles and allow of a readjustment of the volume of the intracranial contents which may last for a considerable time. They do this mainly by diminishing the amount of cerebrospinal fluid and thus temporarily relieving the internal hydrocephalus. The chief indications for employing hypertonic solutions in cerebral tumours are as follows:—

1. As an aid to diagnosis. A patient with cerebral tumour may be lethargic or semicomatose and thus unable to co-operate in the examination, say, of his sensibility or his visual fields. In such cases two or three rectal injections of magnesium sulphate may restore the patient to consciousness and render a complete examination possible.

2. In emergencies, as when a patient with cerebral tumour suddenly becomes comatose. Here an intravenous injection of hypertonic saline solution may reduce the intracranial pressure sufficiently long to permit of operation being performed.

3. As a palliative treatment in inoperable cases, or while a patient is awaiting operation; headache and vomiting are often relieved by giving magnesium sulphate either by the mouth or per rectum.

4. During operations for the removal of cerebral tumour an intravenous injection of hypertonic saline may reduce the volume of the brain to such an extent as to render much easier the surgical manipulations in the region of the tumour.

Lastly, in the treatment of *cerebral hæmorrhage*, the hæmorrhage in the brain raises the intracranial pressure, and with it the general blood-pressure, thereby favouring the continuance of the bleeding. Venesection tends to reduce the general blood-pressure, and with it the intracranial blood-pressure, and is thus one of the best therapeutic means at our disposal. Hypertonic solutions have only a limited value in cerebral hæmorrhage. Intravenous injections are contra-indicated, as tending to raise the general blood-pressure, whilst it is doubtful whether rectal injections can influence a cerebral hæmorrhage already in progress. If, however, there is reason to think that the hæmorrhage has stopped, but the patient shows no sign of returning consciousness, rectal hypertonic injections may be of value. Free purgation, however, by means of magnesium sulphate, reduces the intracranial pressure in exactly the same way as hypertonic solutions and possesses the same physiological justification.

Hypertonic solutions are also useful in other conditions, as in the post-operative treatment of cerebral abscess, where they may be used to reduce œdema of the brain around the abscess cavity, thereby facilitating drainage and diminishing the tendency to hernia cerebri. They may also be used for the relief of headache in meningitis.

REFERENCE.—[1]*Brit. Med. Jour.* 1928, i, 86.

INTUSSUSCEPTION. (*See also* INTESTINES, SURGERY OF.)

John Fraser, Ch.M., F.R.C.S.Ed.

The investigation of intussusception in infants by X-ray examination is rarely practised, for the reason that the diagnosis is usually evident without the aid of X rays. Virgil G. Steven,[1] however, takes the view that this method of examination (barium enema) should be more widely adopted. He believes that the diagnosis of ileocæcal intussusception is often difficult, and that because of this there may be a delay in the adoption of treatment, which is detrimental to the child. In support of this view he quotes various mortality figures. Steven employed the investigation in three cases, and in each he was able to demonstrate the situation of the obstruction.

Last year several articles were reviewed dealing with the method of the bloodless treatment of intussusception, reduction by means of the introduction of water or air into the bowel lumen, and the results obtained by certain observers were remarkably good. On this occasion the only paper brought to our notice is one by W. Anschütz,[2] in which he condemns the bloodless methods, and urges the adoption of operation at the earliest opportunity. His paper brings out some interesting information on the geographical incidence of the disease. In the records of the London Hospital it averaged 22 cases per annum, in St. Bartholomew's Hospital, London, 12 per annum, in Copenhagen Hospital 7·7, in Kiel 3·4, while in Stockholm and Oslo it averaged 1 per annum. The distinctions are very striking, and, if confirmed, are of considerable importance in elucidating the causes of the disease. The purpose of Dr. Anschutz's figures, however, has been to obtain statistics as to the various types of treatment employed in intussusception. In Denmark, for example, the bloodless method of reduction is favoured; in this country, on the other hand, and in certain parts of Germany, reduction by open operation is almost invariably practised. After a reasoned and fair analysis of a large mass of statistics, Dr. Anschütz declares himself a strong supporter of open operation. He sees no advantage whatever in any of the suggested forms of bloodless reduction, and he draws an impressive picture of the uncertainties and risks which surround it.

REFERENCES.—[1]*Surg. Gynecol. and Obst.* 1927, Nov., 698. [2]*Zentralb. f. Chir.* 1927, Dec. 10, 3150.

JAUNDICE. (*See* LIVER, DISEASES OF.)

JAUNDICE, INFECTIVE.

J. D. Rolleston, M.D.

EPIDEMIOLOGY.—During the last five years G. Baermann and E. Smits[1] have paid special attention to febrile diseases caused by spirochætes in the Dutch Indies, with the result that they have collected about 300 cases seen in the Central Hospital at Sumatra, all due to the same organism and mostly of a mild character. Severe cases, however, were also observed presenting typical symptoms of spirochætosis icterohæmorrhagica. Almost all the patients were Javanese workmen employed in the rubber works. Only a few women were represented. Infection was almost always traced to water without rats taking part in the dissemination of the disease. Only 4 deaths occurred among 840 cases. Treatment was mainly symptomatic, but a **Polyvalent Serum** was used in the severe cases.

H. B. Mulholland and W. E. Bray[2] report a typical case of spirochætal jaundice in Virginia which is the eighth proved case recorded in the United States, but like previous writers (*see* MEDICAL ANNUAL, 1928, p. 245) express the opinion that the disease is more prevalent than the few cases reported indicate.

SYMPTOMS AND COMPLICATIONS.—F. A. Bönnig[3] records a fatal case in a man of 48 in which the diagnosis of Weil's disease was based on the clinical symptoms and post-mortem appearances, although *Leptospira icterohæmorrhagiæ* was not found in the blood and organs after death. This negative result, however, was not surprising, as the organism is only present in the blood in the early days of the disease, and the patient was not admitted to hospital until the tenth day. The absence of leptospiræ in the organs post mortem is not infrequent in Weil's disease The chief interest of the case lay in the fact that the symptoms developed on the day after the patient had fallen into a trench containing water, some of which he had swallowed, and the causal connection between this accident and the man's death was allowed by the authorities.

M. Loeper, E. Schulmann, and A. Lemaire[4] report the case of a man, age 26, who in the course of spirochætosis icterohæmorrhagica developed a distinct but transient systolic aortic murmur, which they regarded as an indication of functional aortic disturbance similar to that noted by Garnier and Reilly in a case recorded in 1916.

REFERENCES.—[1]*Nederl. Tijds. v. Geneesk.* 1927, ii, 2478; [2]*Jour. Amer. Med. Assoc.* 1928, xc, 1113; [3]*Münch. med. Woch.* 1927, 1628; [4]*Bull. et Mém. Soc. méd. Hôp. de Paris*, 1928, 83.

KALA-AZAR.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

No further progress has been made with regard to the transmission of kala-azar infection through sand-flies in the past year, but a few interesting observations have been recorded. J. R. Cash and C. H. Hu[1] found very numerous Leishman-Donovan bodies in the skin of artificially infected hamsters without visible lesions, and this led them to examine the skin from two autopsies on human kala-azar, with the result of finding similar skin infection without naked-eye changes, and they suggest that biting insects may be infected from such organisms without sucking the blood.

H. N. Mukherjee[2] has found the search for the parasites in the venous blood facilitated by allowing citrated blood to sediment for three hours, and then removing with a capillary tube the layer at the junction of the serum and the red corpuscles for microscopical examination. H. E. Shortt, S. Das, and J. C. Lal[3] have used the method of making slides from the blood by spreading with the edge of another slide until it is nearly exhausted, and then removing the slide abruptly so as to leave most of the white corpuscles containing the parasites in a line at the end. By examining this end in four slides they found the parasites in 78·7 per cent of 480 cases in the finger-blood without prolonged search.

The *serum-antimony test* for kala-azar has been studied by R. N. Chopra, J. C. Gupta, and N. K. Basu[4] in 129 cases, and all the 70 kala-azar ones gave positive reactions, against 60 plus reactions in 70 aldehyde tests, while it requires less serum, gives an immediate result, and appears earlier in the disease. The test has also been simplified by adding one or two drops of blood to 0·25 c.c. of 2 per cent potassium oxalate solution, and to a little of the mixture in a Dreyer's tube a 4 per cent solution of a urea-antimony salt is added along the side of the tube with a capillary pipette so as to sink to the bottom. A positive reaction is constituted by an immediate formation of a flocculent precipitate in the serum at the junction of the two fluids. In a further paper the same workers[5] report 235 positive reactions in 256 kala-azar sera against 184 positive with the aldehyde test. P. Bhattacharyya[6] has confirmed the value of this test in detecting the early stages of kala-azar in the Calcutta Police Hospital, and A. N. Sen[7] has also had good results in the Campbell Medical School. The nature of the serum changes responsible for these reactions has been studied by R. B. Lloyd and S. N. Paul,[8] who confirm the view that the formaldehyde reaction is associated with an excess of euglobulin in the blood in kala-azar, which is altered in some way, for that obtained by dialysis from normal blood does not give the reaction. In addition there is a decrease in the serum albumin, so that the globulin-albumin ratio rises from 0·66 to over 2·9, but it falls to normal again very rapidly under antimony treatment, three injections of which may bring about the change.

The incubation period in a case recorded by Shortt[9] appears to have been nine to ten months. L. E. Napier and C. R. D. Gupta[10] record a case in a newly-born breast-fed child with symptoms before it was four months old, while they have seen a number of cases in children under one year. H. E. Shortt, H. A. H. D'Silva, and C. S. Swaminath[11] have obtained typical flagellate development of the parasites of the dermal form of leishmaniasis seen in Calcutta in *P. argentipes* fed on the skin lesions, indicating their identity with *L. donovani*. H. E. Shortt, A. C. Craighead, and C. S. Swaminath[12] have published a summary of recent research on kala-azar in India which has already been dealt with in the MEDICAL ANNUAL.

TREATMENT.—Further successful trials of organic antimony with urea have been recorded. Thus, R. N. Chopra[13] and his colleagues have reported on **Urea-Stibol,** which is said to be a salt of urea and p-amino-phenyl-stibenic acid, and so differs slightly from 'urea-stibamine'. It is a white powder forming a brown solution in water, which gave in animals similar reactions to those of other pentavalent aromatic compounds of antimony, and is not very toxic. In fourteen cases of kala-azar it gave rise to no bad effects, and the results were not inferior to those with other urea compounds of antimony. E. C. Hodgson, R. T. Sen, and C. Das[14] report on **Aminostiburea,** made by the Union Drug Co., Calcutta, as a coloured powder in glass ampoules forming a pink solution in water. The doses were gradually increased from 0·05 to 0·2 or 0·3 grm. intravenously every other day, and all eighteen cases were cured by total amounts varying from 1·5 to 2·99 grm., although most of the cases were of long standing. L. E. Napier[15] also records 52 cases treated with aminostiburea, with recovery of 48 and 2 deaths, although 8 had failed to respond to other treatment, and he estimates the cure-rate at 90·9 per cent, so that it compares well with other pentavalent antimony compounds, and is of especial value in resistant cases. Napier[16] also describes a spleen-puncture syringe in which an attachment is fitted to a Roux's instrument to allow of its being worked with one hand, leaving the other free to support the spleen. H. J. Smyly[17] has tested methods of administering antimony other than the intravenous, and found the rectal one inefficient, intramuscular injections too painful and productive of necrosis; but intraperitoneally very dilute solutions of sodium antimonyl tartrate in the form of 12 mgrm. in 60 c.c. of saline, or a 0·02 per cent solution, was only slightly irritating, and it was successful in curing a kala-azar infant six months old after no further doses could be injected into the veins. E. C. Hodgson and R. T. Sen[18] have tested *Vitex peduncılata,* which has a reputation for curing chronic spleen fevers in parts of Bengal, but it failed to cure any kala-azar cases, the infection in which progressed while under the treatment, although the general health showed some improvement.

References.—[1]*Jour. Amer. Med. Assoc.* 1927, Nov. 11, 1576; [2]*Calcutta Med. Jour.* 1928, March, 487; [3]*Ind. Jour. Med. Research*, 1927, Oct., 529; [4]*Ind. Med. Gaz.* 1927, Aug., 434; [5]*Ibid.* Dec., 688; [6]*Ibid.* 1928, March, 123; [7]*Ibid.* 1927, Dec., 692; [8]*Ind. Jour. Med. Research*, 1928, July, 203; [9]*Ind. Med. Gaz.* 1927, Sept., 507; [10]*Ibid.* 1928, April, 199; [11]*Ind. Jour. Med. Research*, 1928, July, 239; [12]*Ibid.* 221; [13]*Ind. Med. Gaz.* 1928, May, 252; [14]*Ind. Jour Med. Research*, 1928, July, 31; [15]*Ibid.* 141; [16]*Ibid.* 149; [17]*Ann. Trop. Med. and Parasitol.* 1927, July, 171; [18]*Ind. Jour. Med. Research*, 1928, July, 35.

KERION. (*See* Skin, Fungous Affections of.)

KIDNEY DISEASE. (*See* Renal Disease.)

KIDNEY, SURGERY OF. (*See also* Hæmaturia; Hydronephrosis; Urinary Antisepsis; Urinary Calculi.)

Sir John Thomson-Walker, F.R.C.S.

Pyelography.—W. W. Galbraith[1] states that in the interpretation of the normal pyelogram the following points must be borne in mind: (1) The ureter should gradually and imperceptibly merge into the wider renal pelvis at the uretero-pelvic junction; (2) The outer line of the ureter, the outer line of the pelvis, and the lowest calix should make a curve corresponding to half a circle, the 'uretero-calicine curve' as described by Thomson-Walker; (3) The pelvis should represent the open mouth of a trumpet; (4) A catheter passed along the ureter as far as it will go should have its point in the uppermost internal calix; (5) The pelvis should divide into two major branches, the major calices, from which the minor calices are given off; (6) The minor calices, about nine in number, when seen in profile should appear cupped at their extremities.

Certain normal variations are met with. The more frequent are: (1) Variation in the size of the pelvis, which in some cases may consist in nothing more than a slight dilatation of the upper ureter, with a well-marked division into the upper and lower major calices; (2) Complete absence of the major calices, the minor calices opening directly into the pelvis.

Where there is any doubt as to whether or not a pyelogram is 'normal' in any given case, a pyelogram of the opposite kidney may serve as a guide in this respect, as in the same individual a pyelogram taken of one kidney is usually similar in form and character to one of the opposite kidney.

Developmental Anomalies.—D. W. Mackenzie and A. B. Hawthorne[2] describe six cases which illustrate the occurrence of inflammatory and other diseases in kidneys that are developmentally defective.

Hydatid Disease.—Hydatid disease of the kidney is rare in this country, and surgeons of large experience have seldom seen more than one or two cases. In Australia the disease is common, and in an interesting article G. Craig and R. K. Lee Brown[3] describe sixteen cases, in five of which nephrectomy was performed and in eight marsupialization or nephrostomy; in three cases no operation was performed. Of 1460 cases of hydatid disease admitted to the Royal Prince Alfred Hospital, Sydney, during the past forty-two years, the disease affected the kidney in 28, or 1·9 per cent. Two types of hydatid of the kidney are described—the open type, which communicates with the renal pelvis, and the closed type, which has no connection with the renal pelvis. Diagnosis of the former type is comparatively easy if a full clinical and urological investigation of the case is made, but the diagnosis of the closed type is difficult, and requires the aid of the intradermal test of Casoni or the complement deviation test of Ghedini. For open renal hydatid disease **Nephrectomy** is the operation of choice, whereas **Marsupialization** or **Nephrostomy** after devitalization of the contents of the cyst by the injection of alcohol or formalin is the safest and best operation for closed hydatid of the kidney. The safest method of preventing the escape of cyst-contents into the perirenal tissues is by means of a **Two-stage Operation.** At the first step, the cyst is exposed and stitched to the abdominal wall. The wound through the abdominal muscles is left open and packed with gauze. Ten to fourteen days later, when adhesions have shut off the surrounding areas, the cyst is evacuated. **Subtotal Nephrectomy** may prove a useful operation when the function of the opposite kidney is poor.

Tuberculosis.—A. Fullerton[4] has investigated a series of 158 cases of urinary tuberculosis seen over a period of twenty years. Definite evidence of renal involvement was found in all except seventeen, in which either the proof was difficult or it was assumed without definite proof that the bladder condition was secondary to genital tuberculosis. Of 87 males, deposits of tubercle were found in the epididymis, prostate, or seminal vesicles in 29, and of the 141 cases presenting evidence of renal involvement, in only 7 was there evidence of bilateral involvement at the time of examination. A previous history of some tuberculous lesion was obtained in 26 per cent, and in 15 per cent a focus was found at the time of examination in some part of the body outside the genito-urinary tract. Nephrectomy was carried out in 73 of the 141 cases with renal involvement, and of these 5 died as the result of operation (6·8 per cent). Of the 68 patients who survived, 55 were followed up, and of these 15 have since died, one twelve years after operation, from what was called a 'cerebral attack', one nine years after from cerebral hæmorrhage, one eight years after from acute pneumonia, one nine and a half years after from gangrenous cystitis, probably not tuberculous. The remaining 11 cases died probably as a result of a continuance of their tuberculous infection. Thirty-one of the survivors are described as being well: 1, twenty years after operation; 2, seventeen years; 1, sixteen years; 1, fifteen years; 1, fourteen years; 1, eleven years; 1, nine years; 1, eight years; 2, seven years; 3, six years; 1, five and a half years; 1, five years; 3, four years; 1, three and a half years; 2, three years; 2, two and a half years; 4, two years; and 3 cases from six months to one year after operation. Including the four cases who died from other causes eight or more years after operation, there is a total of 35 out of 55 apparently cured of their urinary symptoms (63·6 per cent). Of the nine survivors who cannot be claimed as cures, one still has frequency and wears a urinal, but is otherwise in good health twelve years after operation, one has frequency seven years after operation and is said to have the lungs affected, one is fairly well five years after operation but has deposits in the epididymis and spinal caries, one has frequency and wears a urinal six and a half years after operation, one has frequency and deposits in the prostate and epididymis two years after operation, one has frequency two years after, one frequency one year after, one is much improved but not quite well one year after, and one is much improved with apparently normal urine four months after operation. The writer has been able to trace 41 of the 68 cases not subjected to operation, and in all except six advanced cases operation was not contra-indicated in them when they were first seen. Of the 41, 26 (63 per cent) are dead, 24 within six years of the onset of symptoms. From these statistics it would appear that, with our present knowledge, operation remains the most hopeful method of treatment in suitable cases of renal tuberculosis, especially when carried out before a severe degree of extension to the bladder has taken place.

H. Wade[5] analyses a series of 57 cases of tuberculous disease of the kidney, varying in age from 11 to 64 years. The writer especially emphasizes the value of having a preliminary X-ray examination of the urinary tract carried out in all cases of suspected renal tuberculosis, as it is just in the class of case in which further examination is most difficult, owing to extreme contraction of the bladder, that shadows due to the presence of caseous débris may indicate the presence of tuberculous disease in one kidney. All the cases were submitted to cystoscopic examination, and in every case the bladder capacity was found to be reduced, varying from 10 c.c. to 300 c.c., the average being 156 c.c. The degree of contraction is an approximate indication of the severity of the disease in the bladder, and any increase in the bladder capacity subsequent to operation is a very valuable indication as to improvement. The writer is of opinion that pyelography and ureterography are of value in diagnosis, and advocates a wider use of these methods in the investigation of cases of renal tuberculosis. Operation was performed in 53 of the cases; 2 were inoperable and 2 declined operation. Of the 53 cases operated on, one died on the seventh day as the result of thrombosis of the renal vein with extension to the vena cava and the production of a cardiac thrombus. In 34 the wounds healed by primary union, and they left hospital on the fourteenth to the thirtieth day with a sound scar. Of the remaining 18, 12 left with a small sinus at the site of the rubber drain, and 5 with a larger sinus the result of a partial breaking-down of the wound. The cases were carefully followed up subsequently, a complete cure being obtained in 35. Of 11 cases noted as improved, 5 were examined more than four years after operation and were found to be quite well except that they were still troubled with slight frequency of micturition, 4 operated on less than two years before were well but also had some frequency, one had had occasional attacks of renal colic in the remaining kidney, and one developed hæmaturia and active tuberculous cystitis three years after operation. The 6 remaining cases died after leaving hospital, two from complications due to post-operative dissemination of the tuberculous infection, two from the continued activity of the unremoved infective tissue, one from anuria the result of hydronephrotic changes in the remaining kidney, and one from carcinoma of the liver five years after operation.

[It is only in the exceptional cases of closed renal tuberculosis (10 per cent) where the usual methods of investigation may fail, that pyelography can have any diagnostic value. In cases where the diagnosis of renal tuberculosis has been made by the demonstration of pus and tubercle bacilli in the catheter specimen from one or both kidneys, pyelography will afford no further information that is of surgical value. The modern treatment of unilateral renal tuberculosis, whether the infection be early or advanced, is **Nephrectomy**, and the less interference with the diseased kidney or the sound organ before operation the better for the patient.—J. T.-W.]

Michon reports a paper by E. Papin[6] on **Iliac Ureterostomy** of the ureter of the remaining kidney in cases of tuberculosis of the bladder persisting after nephrectomy. The operation is recommended as a substitute for nephrostomy in cases in which it is desired to exclude a bladder which is the seat of advanced and painful cystitis. Since April, 1921, Papin has performed this operation thirteen times on the ureter of the remaining kidney. The ureterostomy is made well forward in the iliac region, necessitating the isolation of the ureter as low down and as close to the bladder as possible. The writer describes his technique and results in detail.

Two Unusual Forms of Renal Growth.—E. S. Judd and H. E. Simon[7] report a case of *angioma of the kidney* occurring in a woman, age 57 years, who for twenty years had had attacks of hæmaturia occurring every four or five years and lasting for from two to three weeks. Occasional attacks of left-sided renal colic were also complained of. Left nephrectomy was performed. The kidney was small, and in the upper pole situated in the cortex was a tumour,

1·5 by 2·5 cm., which on section presented an irregular outline but was sharply demarcated from the surrounding parenchyma. On microscopic examination there was no evidence of encapsulation. The tumour was composed of a network of capillaries and spaces lined with endothelium and filled with blood. The writers refer to eleven cases reported in the literature. Angiomata probably never attain a diameter greater than about 1 or 2 cm.; they are nearly always solitary, and occur either in the cortex or in the medulla, often in a papilla.

V. Vermooten[8] reports a rapidly growing *fibrosarcoma of the kidney* occurring in a man, age 34 years. This was apparently a pure fibrosarcoma, for the most careful search in numerous sections taken from different parts of the tumour failed to reveal the presence of any epiblastic or hypoblastic elements or differentiated mesoblastic tissue, such as muscle or bone, so commonly seen in the embryonal type of renal tumour described by Wilms.

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KÜMMELL'S DISEASE. (*See* SPINE, AFFECTIONS OF.)

LABOUR AND ITS COMPLICATIONS. *Beckwith Whitehouse, M.S., F.R.C.S.*

Twilight Sleep.—J. St. G. Wilson[1] has recently investigated the question of scopolamine narcosis on the lines recommended by a committee appointed by the Section of Obstetrics and Gynæcology of the Royal Society of Medicine, in 1917. A series of 32 cases was treated, consisting of 16 primiparæ and 16 multiparæ. Treatment was commenced by an injection of **Omnopon**, gr. $\frac{2}{3}$, and **Scopolamine Hydrobromide**, gr. $\frac{1}{150}$, the first injection being given in primiparæ when the cervix was dilated to the size of two fingers, and in multiparæ when labour had commenced. A second and third injection of scopolamine, gr. $\frac{1}{450}$, followed at hourly intervals. The average number of injections both in primiparæ and in multiparæ was 4·5. In seventeen cases **Pituitary Extract** (0·25 c.c.) was needed to increase the expulsive power of the uterus. In four cases labour ceased entirely, and injections were withheld until it recommenced. The average duration of labour in primiparæ was fourteen hours forty-five minutes, and in multiparæ sixteen hours twenty-six minutes. The lengthening of the intervals between the uterine contractions was the chief alteration in the uterine function, although the strength and duration of individual contractions were also diminished. This the author attributed to the omnopon. The maternal pulse and respirations were unaltered, but as a rule the blood-pressure tended to fall. Thirst was noticed in every case, and in a few instances nausea occurred. Several of the patients complained of severe pains, especially in the second stage, but general anæsthesia was only required in five cases. In nine cases post-partum hæmorrhage was more than usual, but never excessive. One child was stillborn, and the majority of the children presented varying degrees of apnœa, but recovered on being left alone in a warm place.

Wilson divides his cases into three groups—namely, complete, incomplete, and failed amnesia. Seventeen patients remembered nothing of the labour; twelve remembered various incidents, and therefore fall into the secondary category; the third group contains three cases. The author concludes that the treatment is very good for the mother, lessening both mental and physical strain, but it requires unremitting attention on the part of both doctor and nurse. Uterine action is definitely diminished, and therefore labour is prolonged and may require the use of pressor drugs or artificial methods of delivery,

If the effects of the injections are carefully observed there appears to be no danger either to the mother or child. The memory test is useless, and to attain success strict precautions must be taken to exclude all adventitious stimuli. (*See also* ANÆSTHESIA, pp. 29, 30.)

Ergot.—The effect on the uterus of the different physiologically active substances present in ergot has recently been the subject of inquiry by A. Bourne and J. H. Burn.[2] In accordance with an international agreement, the ordinary official liquid extract of ergot has, since the 1914 issue of the British Pharmacopœia, been a watery extract, and it contains little or none of the alkaloid ergotoxin. The American preparation, however, is an alcoholic extract and contains the specific alkaloid. Bourne and Burn, by means of an instrumental method of registering uterine contraction in the pregnant uterus, have tested the efficacy of the various constituents of ergot, and their work is of considerable practical importance. Ergotoxin has a definite effect in producing a condition of uterine spasm, which is requisite during the puerperium but dangerous during the course of labour. It does not exert its effect until twenty to thirty minutes after hypodermic injection. **Histamine** in large doses (2 mgrm.) has also a powerful effect on uterine muscle, and the authors conclude that a mixture of histamine and ergotoxin, in the proportion of 2 mgrm. of the former to 1 mgrm. of the latter, may be the ideal agent for the control of post-partum hæmorrhage. They also express the opinion that the official extractum ergotæ liquidum of the British Pharmacopœia is a wholly inert preparation, and that the present method of preparation should be revised in order that the specific alkaloid shall be present.

Pitocin and Pitressin in Labour.—The separation of two extracts of the posterior lobe of the pituitary body by Kamm, Aldrich,[3] and others is of considerable interest to the obstetrician. The first, under the name of '**Pitocin**', has been prepared by Parke, Davis & Co., and possesses to a marked degree the oxytocic property or power to stimulate the uterine muscle. The second, '**Pitressin**', possesses pressor properties, and has only a trace of oxytocic activity. J. H. Gaddum,[4] and more recently A. Bourne and J. H. Burn,[5] have investigated in detail the action of both these products on the human uterus in labour. Pitocin possesses the typical stimulant action of the posterior pituitary lobe, whereas pitressin, even in large doses, has no effect. The experience of Bourne and Burn is that pitocin (2 units) produces a large response in one patient and a small one in others, but that as a general rule it produces a useful effect if administered when the os is half dilated. An important point noted by the authors is that pitocin has the advantage of precluding the possibility of pituitary shock, and is therefore to be preferred to the ordinary extracts commonly in use and which contain the pitressin element. Pituitary shock, although not common, is sufficiently alarming to have led to a refusal on the part of some obstetricians to use pituitary extract. The introduction of pitocin is therefore a matter of some importance.

Version in Breech Presentation.—Fœtal mortality in breech delivery is commonly given in the standard textbooks of to-day as varying from 8 to 15 per cent. It appears, however, from recently published papers that these figures tend to err on the low side. Thus Gibbard, from figures compiled from six maternity centres in England, finds a fœtal death-rate of 26 per cent in 136 uncomplicated breech deliveries. The New York Lying-in Hospital Report for 1924 gives a death-rate of 16·4 per cent after deducting macerated fœtuses. In a series of 104 primary breech deliveries at the Winnipeg Hospital recently quoted by F. G. McGuinness,[6] the fœtal death-rate was 19·8 per cent. Since in vertex deliveries the fœtal death-rate is only 2 to 3 per cent, there is without doubt a strong case for performing external cephalic version. Evidence of the value of routine version in this connection is provided by McGuinness in a paper recently published in the *Journal of the Canadian Medical Association.*[7] In a total of 57 cases only one child was lost; of this number 23 were primiparæ and 34 multiparæ. The best time to perform version is during the seventh or eighth month of gestation, 79 per cent of the author's cases falling into these two months. Anæsthesia was only required on two occasions. No instance of premature labour occurred, and there was no case of partial separation of the placenta, as has been mentioned in other series. On two occasions attempts at version were unsuccessful. The first was a primipara at term in whom the breech was engaged and could not be dislodged from the pelvic brim; the second, a multipara at term, was complicated by extended fœtal legs.

Substitution of a cephalic for a breech presentation by external manipulation is generally not a very difficult matter. The position of the fœtus must of course be accurately diagnosed, since the operation must not interfere with the normal attitude of flexion. The first step is to disengage the breech and to direct it into the opposite iliac fossa to that in which the head will descend. This manœuvre, as McGuinness says, is greatly assisted by employment of the Trendelenburg position. Once the breech is disengaged and fixed, pressure is exerted on the occiput, and flexion increased until the fœtus is in the transverse axis of the uterus. Finally, the head is guided into the pelvis, and should there be any tendency for malpresentation to recur, pads may be used as a temporary measure to fix the lie. Version is always more difficult when the legs are extended.

Trial Labour and Contracted Pelvis.—The unknown factor in every labour is the malleability and compressibility of the fœtal head and the force of the uterine contractions. Many fœtal heads that are unengaged before labour readily mould and enter the pelvis at the onset of labour. H. Bailey and H. C. Williamson,[8] in a study based on over 11,000 deliveries, express the view that in cases of moderate pelvic contraction it is always permissible to have a trial labour of at least twelve hours of hard pains, and that this should be conducted without vaginal or rectal examination in order that the vaginal tract may be free from infection should operative delivery subsequently become necessary. If, at the end of this time, the head has entered the inlet, the patient will either deliver herself spontaneously or delivery can be effected by forceps. On the other hand, if the head has not entered the pelvic inlet, a low cervical Cæsarean section should be done. In the authors' series the incidence of pelvic contraction was 676 cases, or 5·8 per cent. With the exception of 5 cases of extreme contraction and 24 elective Cæsarean sections, all the women were given a trial labour: 66 per cent delivered themselves naturally, and only 9·9 per cent of the remainder required Cæsarean section. No maternal deaths followed the low Cæsarean operation. The maternal mortality in the whole series of 676 cases was 0·44 per cent and the gross fœtal mortality 6·2 per cent. These results are of considerable interest coming from a country where the rates for the incidence of Cæsarean section and the mortality accompanying it are too high.

The Failed Forceps Case.—Amongst grave obstetric emergencies there is perhaps none which taxes the judgement and skill of the attendant more than the 'failed forceps' case. D. Miller[9] has recently drawn attention to this very important matter in a review of 500 emergency admissions to the Edinburgh Royal Maternity Hospital. In 17·6 per cent of these emergencies forceps had been applied and extraction had failed. The commonest cause of failure was disproportion, either the result of an abnormally large child or of contracted pelvis. Pelvic contraction was present in varying degrees in about 40 per cent of the cases, the predominant types being the generally contracted and flat rachitic. In 7 out of a total of 34 cases, however, a contracted pelvic outlet was the cause of difficulty; in 5 of these contracted 'outlets' the measurements of the pelvic inlet were normal, and the head had entered the pelvic cavity without difficulty. Occipitoposterior positions were found by Miller to be an almost equally common cause of difficulty. In the majority of cases the malpresentation had never been recognized, and it was common to obtain a history of forceps having been applied several times without success! Many of the patients in this group had severe laceration of the soft parts, probably from slipping of the forceps. In one case actual rupture of the lower uterine segment had occurred. It is interesting and significant to note that in some of these patients natural rotation occurred after admission to the hospital when sufficient time was given! In a third group no obvious explanation of failure could be found, and the author found it difficult to avoid the conclusion that "anxiety to relieve suffering had prompted an attempt to assist delivery before complete dilatation of the passages and adequate moulding of the head had been allowed to take place". Intervention was unsuccessful largely because it was premature, and necessarily entailed, not infrequently, serious injury to cervix and vagina.

In discussing treatment, Miller emphasizes the all-important value of prophylaxis. One-third of the cases analysed were seen by a doctor for the first time *after* the commencement of labour. On the other hand, amongst 6000 patients who had attended the Hospital Ante-natal Clinic during the period under review, there were only three failed forceps cases. Comment is unnecessary. The evidence in favour of careful ante-natal examination, particularly in primigravidæ and in multiparæ with an unsatisfactory previous obstetric history, is overwhelming. When labour is in progress and the head does not advance, it is a matter of primary importance to recognize the nature and degree of obstruction and to determine *before injury has been done* whether vaginal delivery of a living child is possible or not. There is grave danger entailed by the application of forceps through an incompletely dilated cervix, or in the presence of marked disparity in the relative sizes of head and pelvis. Finally, Miller calls attention to the remarkable capacity on the part of Nature, if given time, to overcome considerable disproportion by moulding of the head. It is *not a matter of the actual number of hours a woman passes in labour, but her condition and that of the child, which constitute the indication for assisting delivery.*

The mortality in Miller's series of failed forceps cases was 19 per cent—one which, the author observes, is scarcely exceeded by that associated with any of the major complications of pregnancy or labour.

The Adherent Placenta.—Manual removal of the adherent placenta is one of the most dangerous operations in obstetric practice. According to Bumm there is a 10 per cent mortality following this procedure, and the morbidity from uterine infection has been variously estimated in the neighbourhood of 25 per cent. The risks which digital extraction of the placenta entail are, briefly, implantation of micro-organisms at the placental site, hæmorrhage during and after the operation, traumatic shock, and occasionally rupture or perforation of the uterus. J. Jarcho[10] has recently called attention to the Mojon-Gabaston method as a means of effecting the delivery of an adherent placenta without intra-uterine exploration. The method consists in the injection of warm sterile saline solution into the placenta, via the umbilical cord vein. A retroplacental 'hydroma' is produced thereby which leads to separation of the placenta. The method is by no means new, in that F. Asdrubali,[11] of Rome, in 1814 injected the umbilical vein with spirits of wine for this purpose, and various writers have since drawn attention to the same point. The old technique was not unnaturally complicated by sepsis, and the method consequently fell into disrepute. But in 1914 J. A. Gabaston[12] reported an improved and satisfactory technique, and it is this method which is commented upon by Jarcho. Two hundred to three hundred cubic centimetres of warm sterile **Normal Saline** are injected slowly into the placenta through the umbilical cord vein by means of a Record syringe. The vein is easily located on the surface of the cord owing to the prominent convolutions to which it gives rise. The result of the injection is that uterine contractions are stimulated, and the placenta is expelled after separation by the hydroma. According to Jarcho the procedure is quite simple, and in three cases reported by him the placenta was delivered in from ten to forty minutes; in each case the course of the subsequent puerperium was uneventful. Needless to say, strict antisepsis is requisite, and in Jarcho's cases this was obtained by the application of **Tincture of Iodine** or **Mercurochrome.** To ascertain whether the placenta is detached, Jarcho favours a rectal examination. The actual technique of the Mojon-Gabaston method is illustrated in *Fig.* 56, taken from Jarcho's paper.

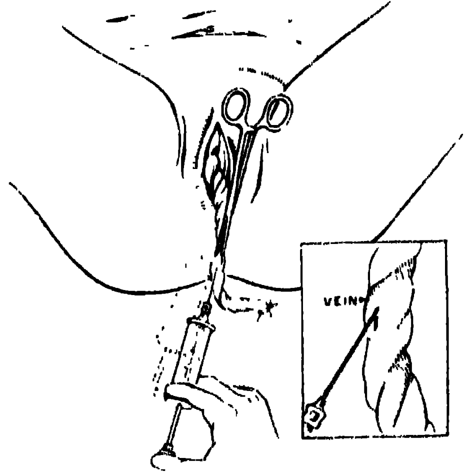

Fig. 56. —The Mojon-Gabaston method of effecting the delivery of an adherent placenta, showing the injection of warm sterile normal saline solution into the umbilical cord vein. The needle is held in place by the artery clamp. The position of the syringe and needle when a second injection is made is also indicated. The inset shows how the needle is introduced into the umbilical cord vein parallel with its course. (*Re-drawn from 'Surgery, Gynecology and Obstetrics'.*)

Post-partum Hæmorrhage.—The causes of failure to control hæmorrhage after delivery of the child are classified by J. S. Fairbairn[13] as follows: (1) General maternal states, of which the most important are shock and grave anæmia (as from ante-partum hæmorrhage), toxæmic conditions and nephritis, fatigue exhaustion and emotional states, overdosage with anæsthetic and analgesic drugs. (2) Uterine conditions, such as overdistension by twins or hydramnios, fibroids, and adhesions to surrounding structures; exhaustion of the uterine muscle from severe or protracted labour or uterine sepsis, and possibly inherent muscular weakness from chronic inflammatory changes in the myometrium. (3) Incomplete emptying of the uterus interfering with retraction, such as retained placenta or portions of it.

If severe bleeding occurs before expulsion of the placenta, and massage and kneading do not produce immediate hardening of the uterus, the after-birth must be delivered, since permanent uterine contraction cannot be secured until the organ is empty. If the fundus can be grasped between the fingers and thumb, expression may be tried by squeezing the uterus like a sponge from above downwards. Should, however, the uterus be relaxed, success is unlikely and inversion may easily be produced. Violent efforts may also tear the placenta and leave a detached portion in utero. Under these circumstances the uterine cavity must be explored with a gloved hand, and the operation should not be postponed until the condition of the patient is desperate. The procedure is serious owing to the grave risk of infection, since the fingers are in immediate contact with the placental site. A copious intra-uterine douche of **Tinct. Iodi** (1 drachm to 1 pint) should therefore immediately follow evacuation of the uterine contents, the douche nozzle being passed up to the fundus so that it can be felt there by a hand on the abdomen. Uterine activity must also be stimulated by intramuscular injection of **Pituitary Extract** (2 units), or **Ergotoxin** or **Ergotamine** (gr. $\frac{1}{65}$ or 1 mgrm.).

Uterine hæmorrhage after expulsion of the placenta is commonly due to exhaustion of the uterine muscles, and must be controlled by bimanual compression on to the fist in the vagina. Fairbairn, in describing this procedure, says that "the whole palm may be spread out over the posterior wall of the fundus and the uterus squeezed down against the symphysis and fist in the vagina. Fatigue, especially in the external hand and arm, may be lessened by leaning the weight on that hand, and, when relief is needed, the nurse or other assistant can press on the hand and even allow it to be withdrawn for a rest, keeping up the pressure in the meantime. The elbow supporting the inside hand obtains a purchase by being wedged into the bed, and, acting passively as the fixed object against which pressure is made, that arm does not tire so quickly." Plugging of the uterus is a difficult and dangerous operation if performed outside a hospital, since the necessary amount of sterile material will rarely be immediately available, and need only be adopted if the recovery of retractile power in the uterus is long delayed.

Obstetrical Sciatic Paralysis.—Sciatic paralysis as a sequela of labour is fortunately a rare occurrence, but when it does happen it is one of those troublesome complications which tax the patience of both mother and doctor to an extreme degree. The condition is in all probability the result of severe intrapelvic pressure, due either to disproportion between the size of the pelvis and the fœtal head, prolonged or difficult labour, or trauma by forceps. Howell,[14] however, has described two cases of sciatic paralysis in women who had apparently normal non-instrumental labours. In the majority of cases the outstanding feature is drop-foot, an interesting fact which seems to point to more severe involvement of the external peroneal nerve than of the other branches of the sciatic. This has been explained by the fact that those fibres of the lumbosacral cord which form the external peroneal nerve lie posteriorly and in direct contact with the bony wall of the pelvis. They are therefore anatomically more predisposed to damage. The symptoms are generally bilateral, and it is difficult, therefore, to understand how direct pressure of the fœtal head can be responsible for the lesion.

S. Kleinberg,[15] who has recently reviewed this subject, suggests that the paralysis is the result of an abnormal increase in the intrapelvic pressure as a whole, and the fact that the pressure is not of the same intensity on all the nerve-bundles accounts for the irregular distribution of the motor and sensory symptoms. Both nerve-tracts are commonly involved, and the pain, often most distressing, may last for many months. Of the affected muscles, the anterior leg group is usually completely paralysed. The other muscles of the leg, thigh, and buttock are affected only exceptionally, and then but temporarily. The prognosis, according to Kleinberg, is extremely uncertain. Whilst in some cases there is rapid improvement, in others the drop-foot is permanent. The treatment, once the lesion has occurred, is entirely symptomatic, and consists of the usual measures to relieve pain, to maintain muscle tone, and to keep the foot at a right angle until improvement ensues.

REFERENCES.—[1]*Med. Press and Circ.* 1927, Nov. 16, 407; [2]*Lancet*, 1927, ii, 560; [3]*Jour. Amer. Chem. Soc.* 1928, 573; [4]*Jour. Physiol.* 1928, Aug., 434; [5]*Jour. Obst. and Gynæcol. Brit. Emp.* 1927, xxxiv, 249, and *Lancet*, 1928, ii, 694; [6]*Jour. Obst. and Gynæcol. Brit. Emp.* 1927, xxxiv, 509; [7]*Canad. Med. Assoc. Jour.* 1928, March, 289; [8]*Jour. Amer. Med. Assoc.* 1927, ii, 2085; [9]*Brit. Med. Jour.* 1927, ii, 685; [10]*Surg. Gynecol. and Obst.* 1928, Feb., 265; [11]*Diario Piamontes*, 1826, June 3; [12]*Münch. med. Woch.* 1914, lxi, 651; [13]*Lancet*, 1927, ii, 1037; [14]*St. Bart's Hosp. Rep.* xliv, 43; [15]*Surg. Gynecol. and Obst.* 1927, July, 61.

LARYNX, DISEASES OF.

A. J. M. Wright, M.B., F.R.C.S.

Contact Ulcer.—Ulceration of the larynx is usually regarded as being due to tubercle, syphilis, or malignant disease. A simple inflammatory ulceration may, however, occasionally be met with, and under the name of 'contact ulcer' Chevalier Jackson[1] describes such a superficial ulceration, occurring on one or both sides of the larynx. The ulcerated surface exists in the posterior region of the larynx, and, if the lesion is bilateral, the ulcerated areas come in contact on phonation. The chief etiological factor is vocal abuse, as would be suggested by the localization of the lesion. There is usually an associated chronic laryngitis, which is probably also a factor in causation. The symptoms consist in a variable degree of hoarseness and some discomfort in the region of the larynx. Occasionally this discomfort may amount to pain, and in some cases choking attacks at night are a symptom. Pathologically the lesion consists of a simple superficial erosion, but, owing to its position under the mucous membrane, the vocal process of the arytenoid may undergo some superficial necrosis.

Diagnosis.—The lesions have to be differentiated from tuberculosis and carcinoma. Their superficial nature is sometimes helpful, but it may be necessary to remove a fragment for section. The mirror picture shows the ulceration on edge, involving the internal surface of the arytenoid cartilage (*Fig.* 57). This ulceration is hidden on phonation (*Fig.* 58), but the thickened upper margin may still be visible.

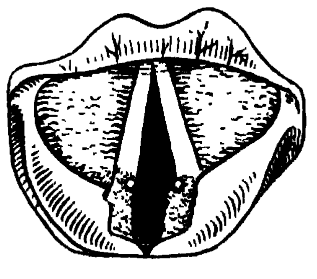

Fig. 57.—Contact ulcer of the larynx, showing the ulceration on edge, involving the internal surface of the arytenoid cartilage.

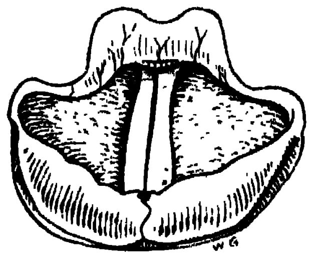

Fig. 58.—Contact ulcer of the larynx, illustrating how the ulceration is hidden on phonation.

(*Figs.* 57, 58 *re drawn from* '*Annals of Otology, Rhinology and Laryngology*'.)

Treatment. — Absolute silence is essential; even whispering should be forbidden, and all irritating applications to the larynx should be studiously avoided. If after two months of complete voice rest healing has not taken place, it is suggested that the ulcer should be excised, presumably by the direct method.

Myxœdema.—The occurrence of myxœdemic changes in the larynx is sufficiently uncommon to render their recognition difficult. J. Adam[2] draws attention to the condition, as a result of having seen three cases which had been missed by general practitioner, physician, and rhinologist. He points out that the diagnosis is missed simply owing to distraction from the general symptoms of the myxœdemic condition by the patient's complaint of the laryngeal symptoms. Apart from the general signs of hypothyroidism, the laryngeal picture is unmistakable. The vocal cords are practically normal, but the posterior wall of the larynx, including the ventricular bands, shows a swollen, red, glazed, beefy appearance. A 'laryngitis' which has lasted for months and has produced no changes in the true cords is presumably a myxœdema. The administration of **Thyroid Extract** cures.

Carcinoma: Treatment by X Rays and Radium (*see also* Pharynx, Larynx, and Tongue, Carcinoma of, Treatment by Deep X Rays and Radium).—One of the great difficulties in satisfactorily treating carcinoma within the larynx by X rays has been the existence of the cartilaginous framework, which both acts as a barrier to the passage of the rays and also is liable to be damaged by them, with subsequent necrosis. To obviate these difficulties, G. Portmann[3] has devised an operation, as a preliminary to X-ray treatment, in which the greater portion of the thyroid cartilage is removed, without, however, opening the laryngeal cavity. The operation (*Figs.* 59–61) consists in exposing the angle of the thyroid cartilage through a vertical incision, dividing the perichondrium along the angle, and, after making a small window in the cartilage, carefully lifting the internal perichondrium without opening the cavity of the larynx. The greater portion of the ala is then removed with punch forceps, leaving a small margin as a support. This proceeding is then repeated on the opposite side, and the wound closed in layers. In some cases it may be advisable to remove the whole of the cartilage on either side, in which event tracheotomy must be previously performed, as the lumen of the larynx becomes obstructed by collapse of the soft tissues.

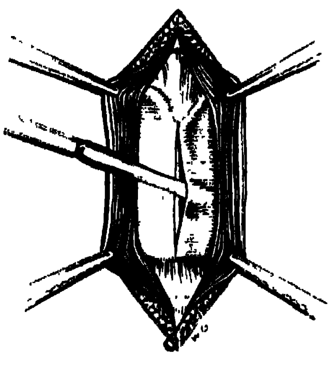
Fig. 59.—Elevation of external perichondrium.

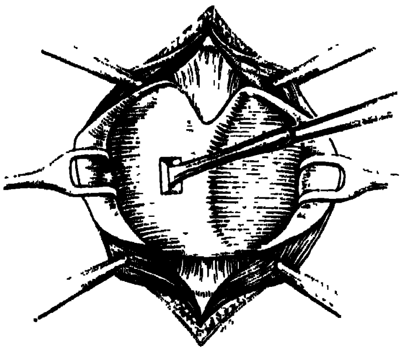
Fig. 60.—Elevation of internal perichondrium.

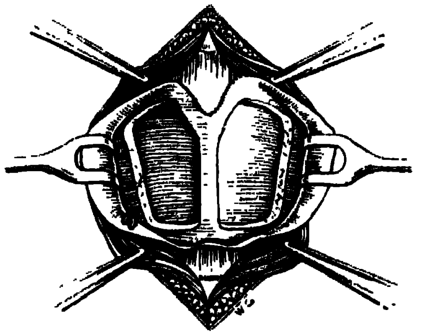
Fig. 61.—After removal of cartilage.

Figs. 59–61.—OPERATION AS A PRELIMINARY TO X-RAY TREATMENT.
(*Re-drawn from 'La Presse médicale'.*)

In the MEDICAL ANNUAL for 1928 (p. 387) some favourable results were reported from treatment with radium. T. J. Harris[4] has endeavoured to collect the end-results of radium treatment for this disease. He has succeeded in collecting the reports of sixty cases treated with radium, of which only two cures of over five years' duration were obtained. He states that the after-effects of treatment by radium have not been satisfactory, the growth having sometimes progressed more rapidly owing to the stimulus of insufficient dosage, whilst in others severe burns have resulted from excessive dosage. He concludes that radium is harmful in the treatment of laryngeal carcinoma. The truth is probably that, as employed in the past, radium has been unsatisfactory, but that gradually, with increasing knowledge of dosage and detail of technique, results are improving. It seems, indeed, that before long radium will replace surgical removal of malignant disease in this region, although, if this be so, an operation of access will still be necessary.

REFERENCES.—[1]*Ann. of Otol. Rhinol. and Laryngol.* 1928, March, 227; [2]*Brit. Med. Journ.* 1928, i, 594; [3]*Presse méd.* 1927, Dec. 14, 1523; [4]*Arch. of Otolaryngol.* 1927, v, 304.

LATHYRISM.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

A field study of this disease in the Bundelkund area of Central India is recorded by T. C. McCombie Young,[1] who failed to find any evidence in favour of a recent theory that the disease is due to an amine formed in the grain associated with this affection. On the contrary, the evidence supports the generally held view that the disease is associated with famine conditions leading to the consumption of an undue proportion of the injurious *Lathyrus sativus* legume over a period of three months or more, which is always followed by a crop of cases of lathyrism. Attempts at the prohibition of the cultivation of the dangerous legume have failed because it is sown with wheat or barley as an insurance against famine, without which crops the cultivator would have nothing to fall back upon in a dry year. If only consumed in small quantities it is harmless, so efforts should be made to limit its use. R. McCarrison[2] records an attempt to produce lathyrism in animals by feeding them on the grain of *Lathyrus sativus* (*khesari*) and with *Vicia sativa* (*akta*), which had produced lathyrism in Rewar, but his results were entirely negative.

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LEGAL DECISIONS, RECENT (on Medico-legal or Public Health Questions).

Joseph Priestley, B.A., M.D., D.P.H.

ADULTERATION OF FOOD AND DRUGS ACTS—ADULTERATED MILK.

At the Stratford Police Court, an Ilford dairyman was convicted for supplying milk which was stated to have been diluted with 5 per cent of added (or extraneous) water, and, in view of the dairyman having been previously fined on six separate occasions for offences in connection with the supply of milk in the past twelve years, the sentence was a month's imprisonment with hard labour. The severity of the sentence is noteworthy as an attempt to deal drastically with an old and persistent offender.

The defendant was also sentenced at the same time for obstructing inspectors in the execution of their duties, the penalty inflicted being £25, with the alternative of a month's imprisonment. For the habitual adulterating of milk, the defendant might have been removed from the register under the powers given under the Milk and Dairies (Amendment) Act, 1922, Section 2, but for some reason not stated the magistrate was not prepared to go as far as that. Such a punishment might have proved more effectual than either a heavy penalty or even a short term of imprisonment with hard labour. Speaking generally, the penalties inflicted in milk-adulteration cases are too small to effect their object, with the result that such adulteration goes on merrily and, it is to be feared, systematically.

MILK (SPECIAL DESIGNATIONS) ORDERS.

The value of pasteurized milk is established, and it is approved officially by the Ministry of Health. Regulations have been issued setting up, *inter alia*, a standard bacterial content for pasteurized milk, viz., not more than 100,000 bacteria per cubic centimetre. Action was taken against a firm in a case in which the public analyst certified 323,333 bacteria per cubic centimetre. Incidentally the lids of the churns were found to be neither rain- nor dust-tight. A penalty of £5 (with £10 10s. costs) was imposed by the magistrate, who also imposed a further penalty of £3 upon the same firm for selling the milk in a district in connection with which no supplementary licence had been obtained, although it was admitted that the firm was duly licensed to sell in the particular district wherein the firm's premises were situated. For retail purposes, therefore, a separate supplementary licence appears to be necessary for each district in which the milk is offered for sale. Wholesale distribution is different, of course. This appears to be a common-sense decision, to which no objection can reasonably be taken. It is clear that the standard for pasteurized milk must be maintained as far as possible, and the higher such standard is, the better. The great value of efficient pasteurization of milk is now admitted.

MISDEMEANOURS AND PROFESSIONAL DISCIPLINE.

The appeal case of Pickup *v.* The Dental Board is of importance as setting the point that the word 'misdemeanour' in the Dentists Act, 1878, Section 13, includes also misdemeanours which are *not* of the class that are triable on indictment. This is the view that has always been held by the General Medical Council in regard to the word 'misdemeanour' which occurs in the Medical Act—the word being interpreted in its widest sense.

MOSQUITOES AS A NUISANCE UNDER THE PUBLIC HEALTH ACTS.

What is known as the Paisley case offers interest as showing how time and advancing knowledge may require elasticity to be given to the words of a statute. In this Paisley case the complaint was against three ditches, situated on low-lying ground close to a residential suburb of Glasgow. These ditches, through alleged neglect, were silted up with, *inter alia,* rank and decaying vegetation, and were consequently ineffective as watercourses, the water being dammed back and overflowing on to the adjacent ground, thus becoming the breeding-ground of mosquitoes (of which three types were found), which attacked people residing in the vicinity, biting them and causing septic wounds and general inconvenience. It was held by the Court that the ditches were watercourses in such a state and so situated as to be a nuisance and injurious or dangerous to health within the meaning of the nuisance clauses of the Public Health (Scotland) Act, 1897. Section 16. The same reasoning would apply to all other Public Health Acts.

ALLEGED PROFESSIONAL WANT OF SKILL AND NEGLIGENCE.

Tyndall v. *Alcock.*—The sympathy of the whole of the Medical Profession will go out to Dr. Alcock in his unsuccessful appeal in regard to the damages given against him in the Court below. The Appeal Court was in a difficult position and had no alternative but to dismiss the application for a new trial because, in the present state of the law, issues of professional skill or negligence must be dealt with (and decided) by juries. Even had the Appeal Court the power to order a new trial, the case would have to be sent down and remitted to another *jury* tribunal. The principle at stake is the present state of the law. Is not a question of professional skill one that ought to be dealt with otherwise than by a jury ?

The original case, in which heavy damages were given against Dr. Alcock, consisted of a fracture of the left arm above the elbow in a girl 8 years of age, the result of a fall from a donkey. The patient was taken twelve miles (without splint) in a motor-car to Gloucester (Dr. Alcock's surgery), where the fracture was set. The allegation was that the fracture had not been properly set—the fractured bones not having been got into true and complete alinement, resulting subsequently in a deterioration of the arm muscles. The arm was bandaged up in a bent position and an X-ray was taken before treatment was commenced and after the fracture had been reduced—a perfect reduction in the opinion of the radiologist. Circulation was afterwards found to be impaired *locally*, and the bandages were loosened and other necessary measures taken, but, unfortunately, without avail. It was a case of Volkmann's contracture

which resulted in permanent deformity, and prevented the patient (a promising child musician) from continuing her music career. £2150 damages were awarded by the jury against Dr. Alcock.

It is difficult to suggest what more Dr. Alcock could have done or ought to have done to secure a successful result for his treatment. The radiologist certified true and perfect alinement of the ends of the bones after the setting of the fracture. It was not even an error of judgement (which is not actionable in law). It is small comfort even to suggest that perhaps the Judges forming the Appeal Court did not agree personally with the jury's findings in the Court below. The fact remains that, in the present state of the law, the Appeal Court was compelled to dismiss the appeal and refuse a new trial. The case was a typical supracondylar fracture of the left humerus with great backward and upward displacement of the distal fragment, followed by ischæmic paralysis.

Stroud v. *Wilson*.—In this case the jury acted differently, the verdict being in favour of the defendant. Everything seemed to depend upon an X-ray examination—whether such examination had or had not been made at the time of the accident (a motor-cycle accident). The evidence showed that an X-ray examination was suggested at the time of the accident, but was refused by the patient. Twelve weeks later the X-ray examination was at last agreed to by the patient, and was consequently made; it showed a fracture of the right femur that had not united. There was also a dislocated collar-bone discovered at the time of the first examination after the accident, but the case under discussion legally was not concerned with that injury. The patient was treated at his own lodgings, and X-ray examinations were suggested again and again by the defendant (Dr. Wilson) at and from the time of the accident, but without avail, the plaintiff refusing to give his consent. Doctors can only advise X-ray examinations; they cannot insist upon them. The lesson to be drawn from the case is the absolute necessity for X-ray examinations in all cases of suspected fractures, and the desirability of such examinations even in definite cases of diagnosed fractures. It is certain that the *suggested* X-ray examination at the time of the accident and on many occasions afterwards, saved Dr. Wilson from a charge of negligence.

WORKMEN'S COMPENSATION ACTS.

Typhoid Fever as an 'Accident'.—A widow of an employee at a night-soil depôt at Young, New South Wales, who died from typhoid fever, was awarded £825 compensation in the New South Wales Courts. The conservancy system was that of the dry double pan. The Judge (President of the Commission), in giving judgement (and damages) to the plaintiff, pointed out the obvious dangers attaching to dealing with night-soil, and stated that typhoid fever was *officially* present in the district at the time (at least one known notified case of typhoid fever). It was, therefore, only reasonable to suppose that the plaintiff's husband's disease had been contracted in the course of his employment, i.e., was an 'accident' in the meaning of the words of the Workmen's Compensation Acts. Generally speaking, 'night-soil' employees are healthy, with a low illness-rate, but that coincidence may be explained by the fact that such employees are a specially selected body of workmen, in the same way that sewermen are, and that new recruits to this particular work would naturally fall out by reason of ill health and unsuitability for such special kind of employment and would be drafted to other jobs. The decision of the Commission is reasonable, apparently, but such a case is certainly exceptional. The decision is none the less equivalent to a legal decision.

***Spinner's Cancer as an 'Accident'.*—In the Oldham County Court an important decision was given, against which an appeal is likely to be lodged. A widow claimed damages for the death of her husband, age 65 years, as the result of spinner's cancer. A medical referee for industrial diseases confirmed the diagnosis of the certifying surgeon, with the result that, as the Judge explained, the matter was taken out of his (the Judge's) hands thereby, and that all that he could do was to give damages. This was done—£250 compensation against the employing firm. Stay of execution was granted on the usual terms. As the law at present stands, the medical referee for industrial diseases who was called in became *ipso facto* the judge, and it would be difficult to understand how a medically-trained man, highly qualified and of wide experience, could have given any other decision, having regard to the present limited knowledge as to cancer as a disease, and its causation. The fact that the plaintiff had not been recently practically engaged in what is regarded as the 'danger zone' of the particular work of cotton-spinning makes no difference—he had been so engaged in years past. No expert (medical or legal) could therefore state *ex cathedra* that the disease from which he died had not been contracted from his work during his working years, and was not, consequently, an 'accident'.

THE VITAMIN CONTENT OF COD-LIVER OIL TABLETS.

The case of Salford Corporation *v.* Boots, for the sale of cod-liver oil tablets not in conformity with the Food and Drugs Acts, is the first case dealing with 'vitamin' as an ingredient. The particular tablets were stated to be McCoy's cod-liver oil extract tablets, which were certified by the public analyst to contain, *inter alia*, 3·2 per cent of oil characteristic of an alcohol extract of cod-liver oil. This oil, judged by the colour test, lacked vitamin A, and further, it was stated, about 160 tablets would be necessary to obtain a minimum dose of cod-liver oil! The Pharmaceutical Society of Great Britain carried out an independent test, showing that the tablets were lacking in vitamin A and also in vitamin D. These tests were based upon animal (rat) experiments, the rats being prepared for experiment by having been fed on a diet free from vitamin A. Administration of 0·01 grm. of the tablets daily did not prevent death in the animals experimented with, whereas a daily dose of 0·002 grm. of cod-liver oil did, the rats under the latter treatment ceasing to lose weight and resuming growth. Further experiments with rats showed that the tablets did not cure rickets, whereas cod-liver oil did. The tablets, therefore, from a point of view of substitutes for cod-liver oil, were medicinally worthless. The magistrate inflicted a fine of £30 and £78 15s. costs.

LEISHMANIASIS. (*See* KALA-AZAR.)

LEPROSY.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

ETIOLOGY AND EPIDEMIOLOGY.—The case for the acid-fast bacilli isolated from lepers by himself and others being the true lepra bacillus is stated once more by W. J. Kedrowsky.[1] The incidence of leprosy on the Bengal-Bihar border line in India has been investigated by E. Muir,[2] as it includes the highest rates in India. He recommends propaganda work, and starting special leprosy treatment dispensaries wherever the rate reaches 2 per mille. J. M. Henderson[3] reports the results of gland puncture in leprosy: he found that positive results could sometimes be obtained in early cases when the skin gave negative results, and positive results were somewhat more numerous in treated than in untreated cases. A. Paldrock[4] concludes from biochemical reactions that lepra bacilli contain free nucleic acid, bound nuclear-protein, kayonic acid, free lipoid, and lipo-proteins. T. C. Boyd and A. C. Roy[5] have found the cholesterol content of the blood to be reduced, especially in advanced cases of leprosy, and it does not return to normal in treated cases. S. D. S. Grevel[6] obtained Kahn reactions about equally in lepers and in syphilitic suspects. E. Muir and J. M. Henderson[7] report on experimental rat leprosy, which they were able to transmit easily from one animal to another by scarification and subcutaneous or intraperitoneal inoculation, but human leprosy material gave negative results in rats and other animals. The rat leprosy bacillus is killed by a temperature of 60° C. for twenty-five minutes or longer.

PROPHYLAXIS.—L. Rogers[8] points out that the power of modern treatment to clear up a large proportion of early, and for the most part uninfective, cases of leprosy makes the old drastic middle-age method of compulsory segregation worse than useless at the present time, unless it is modified to permit early cases to be treated at hospitals and dispensaries without isolation, as otherwise the early cases will be hidden until too late to obtain the full benefit from treatment.

TREATMENT.—Potassium iodide is a very old remedy for leprosy, but has for long been considered harmful on account of the severe reactions it produces. E. Muir[9] has found that such reactions can be controlled by intravenous injections of tartar emetic, while as Marchoux and Bourret in 1908 recorded destruction of lepra bacilli during iodide reactions, just as after sodium hydnocarpate intravenously, the combined use of **Iodides** and **Antimony** has been found by Muir to be very effective in leprosy if given in the following manner: Begin with 1 gr. a day, and increase by 1 gr. each day as long as no reactions occur, and when the dose has reached 20 gr. once a day, increase by 5 gr. at a time, and, after 60 gr. is reached, by 30 gr. up to 180 and eventually to 240 gr. in a single dose well diluted with water. The larger doses are given only twice a week, and the full dose is eventually taken for three periods of one month with a month between each course, and if no reactions occur with the full doses the patient is believed to be cured. The foregoing increases are only given as long as no reaction occurs, but in advanced cases a single grain may produce a prolonged severe reaction, and a rise of temperature to 100° F. or swelling of the local lesions is considered to be a reaction indicating cessation of the drug until it has ceased, when the last dose is repeated, and the doses are now given only once a week, beginning with the same dose that caused the reaction. If a febrile reaction or much local swelling lasts for three days, give an intravenous injection of 0·02 grm. of tartar emetic every second day until the reaction ceases, and then go on with the iodides as before. Proportionately smaller doses are used in children. Progress is reported to be often as great by this plan in a few weeks as in a few months with chaulmoogra oil preparations, although the latter can be used together with the iodides with advantage. In advanced cases in the active second stage great caution is necessary in giving iodides for fear of harmful severe reactions, and fatal results can be produced by the drug.

L. Rogers[10] reports on the use of **Iodides** and **Hydnocarpates.** He confirms the value of iodides in early cases with slight lesions, and also in those in which the lesions have nearly cleared up under hydnocarpates, but agrees with Muir that great caution is necessary in using this drastic treatment in advanced active cases. He reports further good results with Burroughs & Wellcome's unirritating sodium hydnocarpate, issued under the name of 'alepol,' and other very favourable reports of the use of this very cheap remedy have since reached him, and also very good results in Fiji by E. Neff of Martindale's sodium gynocardate C, consisting largely of hydnocarpates and gynocardates. F. G. Rose[11] reports on the trial of various forms of **Chaulmoogra** preparations at the British Guiana Leper Hospital in 175 cases. Ethyl esters were used in 95 cases of all stages, and 19 were cured, by which he means complete removal of all signs of the disease; in 39 more all symptoms were arrested, and another 30 had improved. Of 55 bacteriologically positive cases, 41·8 per cent had become negative. Creosoted hydnocarpus oil and sodium hydnocarpate had only been in use for a few months, and the results were promising, but sodium morrhuate and thymol were ineffective. No relapses have yet been noted. E. Muir and S. P. Chatterji[12] recommend **Ephedrine Sulphate,** in hard gelatin capsules, in a single dose of 0·05 to 0·1 grm., for the relief of the nerve pains of anæsthetic leprosy, in the place of injections of adrenalin. A. Paldrock and A. Rangel[13] report a trial of sanocrysin in three cases of leprosy without any benefit.

N. A. Dyce Sharp[14] has investigated the effects of *protein shock* in lepers by slow intravenous injection of 0·5 c.c. **Sterile Tinned Milk** diluted with 9 parts of distilled water. Giddiness, cardiac pain, imperceptible pulse, respiratory distress, and other severe symptoms were induced, followed by a rise of temperature to 103° to 104°, which passed off in two days. Remarkable improvement followed in some advanced cases, and 4 out of 12 followed up for five months or more showed definite benefit. He concludes that the treatment is drastic 'and undoubtedly dangerous', but might be applicable to the more desperate and hopeless cases, though he thinks it would probably be harmful in early cases of childhood. P. Manson-Bahr[15] reports two cases of anæsthetic leprosy in which **Protein Shock,** in the form of intravenous injection of **Vaccines** such as T.A.B. in weekly doses of 50 million gradually increased up to 200 million, was followed by great benefit, and he thinks it worthy of further trial in early nerve leprosy.

REFERENCES.—[1]*Jour. Trop. Med. and Hyg.* 1928, Jan. 16, 17; [2]*Ind. Med. Gaz.* 1927, Aug., 440; [3]*Ibid.* 438; [4]*Amer. Jour. Trop. Med.* 1927, Nov., 405; [5]*Ind. Jour. Med. Research*, 1928, Jan., 643; [6]*Ibid.* 683; [7]*Ibid.* 807; [8]*Practitioner*, 1928, April, 209; [9]*Ind. Jour. Med. Research*, 1927, Oct., 507; [10]*Lancet*, 1928, i, 73; [11]*Trans. Roy. Soc. Trop. Med. and Hyg.* 1928, March 31, 481; [12]*Ind. Med. Gaz.* 1928, April, 198; [13]*Amer. Jour. Trop. Med.* 1927, July, 241; [14]*Trans. Roy. Soc. Trop. Med. and Hyg.* 1928, Jan. 31, 305; [15]*Lancet*, 1928, i, 1111.

LIVER, DISEASES OF.

John H. Anderson, M.D.

Cirrhosis.—With advances in etiology and pathology difficulties arise as to old methods of classification, and C. H. Greene, C. S. McVicar, A. M. Snell, and L. G. Rowntree[1] draw attention to the confused and unsatisfactory nature of the present grouping of the various types of cirrhosis of the liver. While deprecating the production of a new classification, L. G. Rowntree[2] suggests the following clinical grouping, which was used as a working basis in a study made by his associates and himself:—

1. PORTAL OR ASCITIC CIRRHOSIS	1. Portal cirrhosis with ascites and small liver (Laennec) 2. Portal cirrhosis with ascites and large liver 3. Portal cirrhosis with ascites and jaundice 4. Large liver without ascites as portal cirrhosis in pre ascitic stage	*Etiology*	*a.* Primary *b.* Secondary to known factors:— Toxic: alcohol (Laennec). copper, arsenic, spices, foreign proteins, exophthalmic goitre, eclampsia Infection: syphilis, malaria, tuberculosis, various parasites Pigment deposit: (hæmochromatosis from copper) Biliary obstruction (end-stage) Splenomegaly (Banti's disease)

II. BILIARY OR ICTERIC CIRRHOSIS	1. Biliary cirrhosis without extrahepatic obstruction	*Etiology*	*a.* Primary (Hanot) ?
	2. Biliary cirrhosis with extrahepatic obstruction		*b.* Secondary to known agents : Toxic Infections : colon bacillus, syphilis Secondary to obstruction (gall-stones, tumour, stricture, and so forth)
	3. Biliary cirrhosis with ascites (end-stage)		

Fifty cases of cirrhosis were studied, mainly from the standpoint of evaluating the clinical usefulness of tests for hepatic function. Complete laboratory data and abstracted histories of illustrative cases are given. It was found that in advanced cirrhosis of either main type the marked retention of dye in the phenoltetrachlorphthalein test bore no reference to the presence of ascites or jaundice. In portal cirrhosis the marked dye retention was striking, when the small amount of bilirubinæmia was considered. The disappearance of ascites was not followed by a great lowering of dye retention, and they consider that the circulatory disturbance, responsible for the ascites, is not of itself an index of the degree of liver damage.[2] In some cases of portal cirrhosis a latent icterus was present, though the skin was clear. In biliary cirrhosis the serum bilirubin was uniformly raised, as was the dye retention, but not to the same extent as in portal cirrhosis. This inability to get rid of the dye in biliary cirrhosis probably bears some relationship to permanent changes in the liver. In this connection it is interesting to note that V. S. Counseller,[3] by means of the celloidin injection and corrosion method, has shown that a portal embarrassment, with a parenchymatous atrophy, follows the general enlargement of the intrahepatic biliary system caused by stricture of the common duct or injury to the gall-bladder by stone. Some such injury to the liver cells may well be the cause of the lowered hepatic function just referred to. Rowntree and his co-workers consider that in the end-stages of cirrhosis, whether portal or biliary in origin, the clinical, pathological, and functional changes may be well-nigh indistinguishable, and the diagnostic differentiation can only be based on the history and sequence of events. P. A. O'Leary, A. M. Snell, and E. G. Bannick[4] draw attention to the danger of portal cirrhosis associated with chronic arsenical poisoning. They describe two cases following the therapeutic use of the drug, both of whom had well-marked skin changes, ascites, and other signs of portal cirrhosis. Treatment relieved symptoms in each case. That patients with hepatic cirrhosis are bad risks is well known, and R. L. Dourmashkin[6] reports two cases of death and one of jaundice following urethral instrumentation in patients suffering from obstructive lesions in the urinary tract with coexisting cirrhosis of the liver.

Jaundice.—While accepting McNee's division of jaundice into obstructive, intrahepatic (toxic or infective), and hæmolytic, C. S. McVicar and W. T. Fitts[5] give their essentials of a working classification as (1) the van den Bergh reaction of the serum, (2) the amount and variation of the serum bilirubin, (3) the amount of bile reaching the duodenum, (4) the presence or absence of pain, and its character when present. Pain, if present, may be a definite colic (as in stone in the duct) or a mere soreness. In hæmolytic and intrahepatic jaundice, and in obstructive jaundice due to pressure on the duct from without, pain is typically absent. If in any of these conditions there is liver distension, right upper abdominal *discomfort* may be felt, but even the persistent and boring pain sometimes noticed with malignant disease of the bile-ducts is never colicky. In painless jaundice with a high degree of serum bilirubin it is difficult to differentiate between intrahepatic causes and compression of the common duct from extrinsic tumour, generally malignant disease of the pancreas. In a patient under 35 years of age malignant pancreas is most unlikely. Over that age the differentiation depends on showing bile in duodenum or intestine. Pancreatic carcinoma occludes the duct quickly and completely, while complete suppression of bile in intrahepatic jaundice seldom occurs, and then only for a day or so. Secondary signs, such as size and consistency of liver, palpable gall-bladder, pruritus, colour of skin, diarrhœa or constipation, loss of weight, are regarded as very variable. Functional tests have not yet attained diagnostic value. The authors urge strongly that in all cases of unexplained jaundice a search for a primary malignancy in the gastro-intestinal tract is essential. This working classification is a simple and useful one, but it has the objection that patients' conception of pain varies so greatly, and in many cases memories are short and unreliable. [In a recent case, where over eighty stones were found in the gall-bladder and three in the common duct, all discomfort even was denied by the patient. A definite history of previous pain, severe enough to require morphia, was only obtained from relatives after operation.—J. H. A.]

C. E. Newman[6] has seen several cases of jaundice, clinically and biochemically obstructive in type, in which no obstruction could be recognized. In two who died, death was regarded as due to necrotic areas in the liver following a parenchymatous degeneration secondary to sepsis and chloroform, either alone or acting in conjunction. Newman suggests that the jaundice was due to an absorption of bile by the blood-stream through the capillary endothelium in these necrotic areas, and believes this mechanism would explain all jaundice of the toxic infective type.

Bleeding in jaundiced patients is well known and feared, and the cause is generally regarded as being intimately related to some fault in the availability and utilization of the body calcium. A. Cantarow, S. M. Dodek, and B. Gordon[7] mention several theories regarding this mechanism. The bile salts present may retard the conversion of fibrinogen to fibrin, or the calcium may combine with the excessive bile pigments in the blood and so become functionally unavailable. The main therapeutic measures are **Calcium** and **Parathyroid Extract.** When the *serum* calcium was estimated it was found that there was but little variation in jaundiced (9·3 to 12 mgrm. per 100 c.c.) as compared with non-jaundiced patients (10·09 to 10·4 mgrm. per 100 c.c.). If, however, the *whole blood* was examined, there was a wide variation in the jaundiced patient (4·8 to 12 mgrm. per 100 c.c.) when compared with the non-jaundiced (6·4 to 9·6 mgrm. per 100 c.c.). Twelve hours after the administration of parathyroid extract this wide variation had almost disappeared, and the range was practically the same in both types of patient. The action of the parathyroid, then, is to mobilize the calcium, and in jaundice to restore the normal distribution and functional availability. According to Cantarow and his colleagues, the effect on the tendency to hæmorrhage is checked by (1) the increased coagulating power of the blood, and (2) the diminished permeability of the capillary walls.

General Treatment of Liver Cases.—With regard to the medical and surgical management of disease in liver and bile-passages, A. M. Snell and J. F. Weir[8] make some useful comments on general therapeutics. They stress a high carbohydrate intake with low protein and reduced fats in liver disease, and the avoidance of fat and cholesterol in cholecystitis. They doubt the value of non-surgical biliary drainage, cholagogues in general, and also of more direct stimulants to the gall-bladder, such as magnesium sulphate, egg-yolk, and oleic acid. Biliary antiseptics have proved disappointing. For hepatic syphilis they use mercury by mouth, skin, or injection, coupled with the iodide of potash, arsenical preparations only being used if these measures fail. With regard to symptomatic treatment, general diathermy is advised for pruritus, and also one or two grains of calomel, twice or thrice a week, given in quarter to half grain doses hourly. Addison's pill (mercury, squills, and digitalis) is found best for hepatic congestion. Good results have been obtained in ascites with a dry diet, reduced fluid and salt intake, combined with merbaphen or novasurol and ammonium chloride. This line of treatment requires pushing, as at first little or no diuretic effect may appear. There is little to be done for the toxic states associated with portal cirrhosis, though sometimes intravenous glucose helps. All cases for operation need special preparation, and the post-operative toxic state in hepatic disease is best treated with plenty of fluid, especially in the form of water. Salt, alkali, or glucose solutions are to be given according to the clinical and laboratory findings.

REFERENCES.—[1]*Arch. of Internal Med.* 1927, Aug., 159; [2]*Jour. Amer. Med. Assoc.* 1927, Nov. 5, 1590; [3]*Ann. of Surg.* 1928, Feb., 210; [4]*Jour. Amer. Med. Assoc* 1928, June 9, 1856; [5]*Ibid.* 1927, Dec. 10, 2018; [6]*Lancet*, 1928, i, 1012; [7]*Arch. of Internal Med.* 1927, Aug., 129; [8]*Jour. Amer. Med. Assoc.* 1927, Oct. 8, 1209.

LIVER EFFICIENCY TESTS.

John H. Anderson, M.D.

The position of liver efficiency tests still remains unsatisfactory. It is fairly well recognized that at present no single test exists for liver function which can be completely relied upon in any one single case, and it is becoming increasingly clear that a combination of tests is the best way of estimating hepatic function. Even then the margin of error is large, and negative results must be accepted with great caution, owing to the large reserve power of the liver. A full review of liver efficiency tests was recently made (MEDICAL ANNUAL, 1928, pp. 261–266), to which there is little to add.

Simultaneous Cholecystography and Determination of Liver Function. W. H. Cole, G. H. Copher, and E. A. Graham[1] have extended their use of intravenous injection of sodium phenoltetraiodophthalein, as used for cholecystography, to include a test for hepatic efficiency. The determination of the excretory function of the liver by the use of various phenolphthalein dyes was originated by Abel and Rowntree in 1909, and has been extensively worked on and modified by S. M. Rosenthal. The root objection to all dye tests is their dependence on the patency of the biliary passages. Graham and his co-workers point out that the present test has one advantage in that a larger amount of the dye is put into the circulation. "Injections of minute quantities of a dye can hardly be expected to give the liver a sufficient amount of work to perform really to test its capabilities of excretion." They use 0·04 grm. of phenoltetraiodophthalein per kilo of body-weight, dissolved in sufficient freshly distilled water to produce a solution whose concentration does not exceed 8 per cent. After filtering and sterilizing in a water-bath for fifteen or twenty minutes, this is given into a vein in one dose, and blood samples are taken one-half and sometimes one hour later. The standards for comparison are made by adding 48 mgrm. of the dye to 100 c.c. of distilled water, which represents 100 per cent standard. Various dilutions of this are made, to each of which 2 c.c. of 10 per cent sodium hydroxide is added to prevent fading. Sufficient blood should be obtained at the half-hour venepuncture (12 to 14 c.c.) to allow some of the serum to be used as a control. Rosenthal uses for his control serum obtained from blood collected before injection of the dye. Graham and his co-workers claim that their method eliminates possibility of error from causes such as hæmolysis. A tube containing one half of the serum obtained at the half-hour is then placed in the comparator box and beside it a tube containing distilled water. In front of the tube of water is placed the other half of the available serum, which is then alkalized by adding a drop or two of 10 per cent sodium hydroxide to bring out the colour. This is mixed well by shaking. In front of the tube of non-alkalized serum, standards are then fitted until one is found that matches the colour reflected through the alkalized serum and the tube of water. Normally about 12 per cent of the dye remains at half an hour, and 5 per cent at the end of one hour (50 cases). The highest figures at half an hour were obtained in jaundice due to common-duct obstruction by stone 55 per cent, catarrhal jaundice 90 per cent (one case only), advanced cases of atrophic cirrhosis 47 per cent, duodenal ulcer accompanied by inflammatory process in the gall-bladder 58 per cent. Where there was cholecystitis without jaundice, the figure was raised (27 per cent at half an hour in about 90 per cent of cases), but not to the same extent as when the common duct was blocked—a finding which bears out what has been mentioned above as to the inherent disadvantage of all dye tests. Carcinoma of the liver, whether primary or metastatic, gives a low figure – average 28 per cent at half an hour in eight cases. "Many of them, even in the presence of deep jaundice, had almost normal figures of retention." Moreover, the retention figure varied with any variation of the jaundice in the stone cases, but remained almost a constant figure in those showing malignancy. The test was helpful in the determination of operability. In three patients who died after operation (two after cholecystectomy and one after gastro-enterostomy) the figures of dye retention prior to operation were 70, 90, and 75 per cent respectively. The conclusions reached are that the test furnishes "very valuable information in the differentiation between obstructive jaundice due to malignant disease and that due to stones and inflammations", and that "a knowledge of the amount of the retention of dye has also proved of great prognostic value in enabling one to gauge the operative risk".

Van den Bergh Reaction.—L. Schiff[2] has conducted a wide investigation as to the serum bilirubin in health and disease, using this reaction for purposes of estimation. In healthy subjects he found a higher level in males than females, but no distinct difference in the various age groups. It is of prognostic value in congestive heart failure, levels exceeding 1 mgrm. per cent being frequently followed by death. While there is an increase in the serum bilirubin during attacks of gall-stone colic, there is none in the gastric crises of tabes, and according to Meulengracht none in renal colic or acute appendicitis. In S. L. Vaughan's[3] hands the van den Bergh and icteric index agreed "in the vast majority of instances". The experience of R. G. Williams[4] was that the lævulose tolerance test was more suitable in estimating liver damage following malaria treatment in general paralytics. C. H. Greene and his co-workers[5] found the test useful in liver cirrhosis, it being of particular value in determining the degree of bile retention in the biliary group.

Lævulose Tolerance Test.—Observations have been made regarding the effect on the liver during malaria treatment in general paralytics, as shown by the lævulose tolerance test. Curves were taken before, during, and after treatment, and the results as reported by R. G. Williams[4] are interesting: "In every malarial case before the end of the treatment the curves were of the type indicating some hepatic insufficiency, and in many cases the curves became irregular after the first or second rigors." Patients whose curves showed extreme hepatic insufficiency remained critically ill, even when treatment was stopped, and in one who died acute yellow atrophy of the liver was found at autopsy. Relapses were also shown by abnormal curves. After drawing attention to the severe effect this line of treatment has on the liver, Williams suggests that lævulose tolerance curves are satisfactory for detecting and estimating liver derangement, and are also useful for controlling therapeutic malaria. The value of the procedure is greatly enhanced when curves are done in series.

Miscellaneous.—C. H. Greene and others[5] found the phenoltetrachlorphthalein test of particular value in the diagnosis and study of cases of portal cirrhosis with ascites. They regard it as an index to the existing functional balance between degenerative and reparative changes in the liver.

Summary.—A new dye test is mentioned and its technique described. Liver efficiency tests are being extended to gauge operative risk, to assist in prognosis, and to control therapeutic measures. Severe damage may be done to the liver by malaria treatment in parasyphilis.

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LIVER, HYDATID DISEASE OF. (*See* HYDATID DISEASE.)

LIVER, SURGERY OF.

A. Rendle Short, M.D., F.R.C.S.

Traumatic Rupture of the Liver.—A paper by A. J. Graham,[1] of Chicago, indicates that the liver is more often injured than any other abdominal organ. A sudden rise of the pulse-rate to 140–160 is almost characteristic of hæmorrhage. As primary shock passes off the local signs become clearer, but this may not be for twenty-four hours, when abnormal dullness may be found, or loss of liver dullness due to tympanites. Rigidity is a valuable sign. It may be that the picture of internal hæmorrhage will develop. There may be pains over the liver or in the right shoulder. At operation, if the bleeding is severe, it may be checked by compression of the hepatic artery in the hepato-duodenal ligament. If its substance will hold stitches and the case is not *in extremis*, suture is the best treatment. In difficult cases, pack, but subphrenic abscess is likely to follow.

Talma's Omentopexy for Cirrhosis of the Liver.—L. Kirchmayr,[2] of Vienna, has modified this operation, with a view to securing better vascular anastomosis, by exposing and freeing a length of veins in the great omentum and in the abdominal wall behind the rectus - veins draining into the internal mammary and epigastric. He then cuts and ties three or four of each set of veins, omental and parietal, and lays them alongside each other as one might lay the last joints of the index fingers side by side. They are united with fine silk threads. He believes that a vascular communication will later open up, and has some post-mortem evidence to that effect.

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LUNG, ABSCESS OF. (*See* CHEST, SURGERY OF.)

LUNG, ASBESTOSIS OF. (*See* PULMONARY ASBESTOSIS.)

LUNG, CARCINOMA OF. (*See also* CHEST, SURGERY OF.)

W. H. Wynn, M.D., F.R.C.P.

PREVALENCE.—Attention has been called in recent volumes of the MEDICAL ANNUAL to the increase in cases of primary cancer of the lung. A real increase is doubtless due to increased longevity, but improved methods of diagnosis, especially the use of X rays, and the selection of more urgent or more difficult cases for admission into hospitals, may account for some of the apparent increase. Reports from clinics in Europe and America show an incidence of 5 to 6 per cent of all necropsies. J. B. Duguid,[1] of 1126 post-mortems in the Manchester Royal Infirmary during the years 1921–25, found an incidence of 2·57 per cent.

ETIOLOGY AND PATHOLOGY.—The majority of the tumours arise from the bronchi, and it would lead to a clearer clinical conception if the term 'bronchial carcinoma' were more often used, reserving the term 'pulmonary carcinoma' for the rarer cases in which a bronchial origin has been excluded by the most careful clinical and bronchoscopic examination. Weller[2] in 1913 was able to collect from the literature reports of 90 cases of primary carcinoma of the bronchi, and T. McCrae, E. H. Funk, and Chevalier Jackson[3] have collected 128 additional cases since 1913 and add 14 cases of their own. Recently W. G. Barnard[4] has suggested that the tumours of the mediastinum formerly regarded as lymphosarcomata are in reality carcinomas arising from the larger bronchi, and Professor Shennan[5] supports this opinion. These tumours consist of characteristically oval or spindle-shaped cells—'oat-cell' tumours. Duguid examined 78 cases of intrathoracic tumour histologically, and found that all but 10 could be included in two groups. *Group* 1 comprised the typical carcinomas of the bronchi, 16 being of the large-celled alveolar type and 13 of the squamous-celled type. *Group* 2 consisted of the oat-celled tumours, 32 being typical and 7 varying from the type in containing small round cells. The true nature of the oat-cell tumour is of importance, as Duguid points out, as if they are bronchial cancers the bronchi and not the mediastinal glands must be regarded as by far the most important structures in regard to tumour growths of the thorax. In Manchester, bronchial cancers, instead of constituting only about 37 per cent of thoracic tumours, would thus constitute over 80 per cent. The fact that so many tumours arise in a tissue directly exposed to the atmosphere arouses the suspicion that impurities in the air may be an important factor in causation, and the suggestion that inhalation of tar particles or petrol fumes plays a part has to be seriously considered. It has also been suggested that these tumours have been more common since the influenza epidemic of 1918, and influenzal infection especially attacks the bronchi. Statistics of age and sex from many sources agree that about 90 per cent of cases occur after the age of 35, and that the proportion of males to females is about 4 or 5 to 1. In McCrae's 187 cases the right side was involved in 40 per cent, the left in 47 per cent, both sides in 9 per cent, and doubtful in 4 per cent. In Duguid's 175 cases of intrathoracic tumour the right lung was affected in 78, the left in 67, and both lungs in 18, with no lung involvement in 12. B. M. Fried[6] believes that metastases occur early and often obscure the symptoms and signs of chest disease. He calls attention to the frequency of metastases in the brain, which is rare in extrapulmonary cancer, and attributes this to the absence of any barrier between the lungs and brain, the tumour invading the blood-vessels and giving rise to malignant emboli. McCrae found in 128 cases extrathoracic metastases, recognized ante mortem in 39 and post mortem in 85. In his experience metastases occurred late in the disease. In Duguid's 175 cases secondary growths were reported in the liver in 27, abdominal glands 26, adrenals 18, kidneys 9, bones 8, brain 2, and spleen 1.

Symptomatology.—McCrae, Funk, and Jackson[3] point out that the clinical picture varies greatly, depending upon the rapidity of growth, the degree of ulceration and obstruction, the pressure on adjacent structures, the occurrence of hæmorrhagic effusion, infection, and abscess formation, and local and general metastases. The onset is usually insidious, but may be with hæmoptysis, pain in the chest, or symptoms resembling acute bronchitis. While the early symptoms are usually bronchial, these are sometimes obscured by symptoms of metastases in the nervous system, abdomen, or bones. Local symptoms such as cough, sputum, hæmorrhage, dyspnœa, and pain occur in nearly all cases. The cough is not characteristic. It occurs early, and may be continuous or subject to periods of improvement and aggravation. Wheezing is frequent, and in the later stages the cough may resemble that of aortic aneurysm. Sputum may be absent at first, later it varies from a scant mucoid

PLATE XXXI.—BRONCHOSCOPIC VIEWS OF NEOPLASTIC DISEASES

1. Bronchoscopic view as seen in a recumbent normal person, when the tube mouth is a few centimetres proximal to the bifurcation of the trachea. The carina is seen as normally thin, sharp, and whitish, and it is located a little to the left of the median line. The left bronchial orifice appears somewhat as a crescent; the right bronchus, which is anatomically the continuation of the trachea, is seen extending into the depths of the right lung. Anteriorly a small portion of the middle lobe bronchus is visible. In addition to normal form and colour, normal movements, beautiful, wavy, flexible, rhythmic respiratory and more abrupt pulsatory movements, are noted in the normal. It is of the utmost importance that these normal appearances be studied.

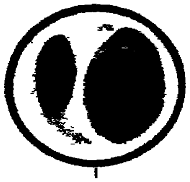
2. Broad carina in a man, age 48, indicating infiltration of the glands beneath the bifurcation (compare with 1). The glands might have been inflammatory, tuberculous, or malignant, but the accompanying fixation, rigidity, and other evidences of infiltration warranted a diagnosis of cancerous metastases, which was confirmed by the bronchoscopic finding of a malignant lesion in the right bronchus.

3. Deformity and displacement of the carina backward to the right by a large cancerous infiltration, not yet ulcerative, which occludes the left bronchial orifice.

4. Cancerous nodules occluding the right main bronchus in a man, age 48. The erroneous diagnosis of asthma had been made prior to the patient's coming under the care of Dr. E. H. Funk, who suspected cancer and requested a diagnostic bronchoscopy.

5. Fungating carcinoma of the trachea with a scabbard-shaped lumen due to metastatic infiltration. Histologic examination of a bronchoscopically removed specimen showed the growth to be a carcinoma. The patient, a woman, age 48, had been treated for more than a year for asthma because of paroxysmal coughing and wheezing.

6. Cancerous nodules in the right bronchus of a man, age 42. The bronchoscopic diagnosis was confirmed by the histologic report of adenocarcinoma made on a bronchoscopically removed specimen.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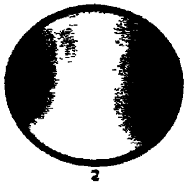
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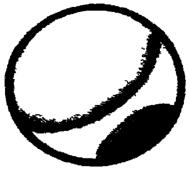
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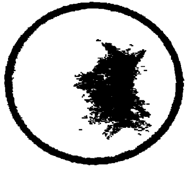
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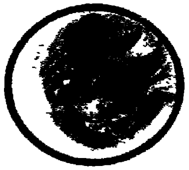
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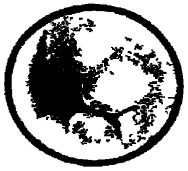
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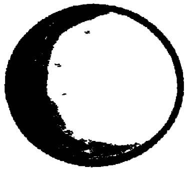
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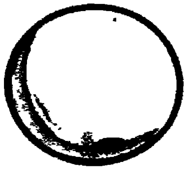
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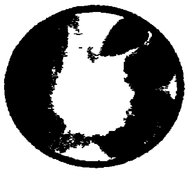
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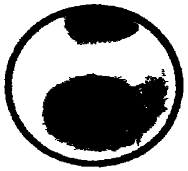
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7. Bronchoscopic view of an endobronchial carcinoma diagnosed bronchoscopically, and verified histologically by an examination of a specimen removed through the bronchoscope. Exsanguinating haemorrhages ceased after bronchoscopic insufflation of bismuth subcarbonate. Deep roentgen-ray therapy arrested the progress of the growth. The patient is in good general condition after four years. Prior to admission the patient was erroneously supposed to have tuberculosis.

8. Bronchoscopic appearances of an endobronchial carcinoma in a woman, age 38. Histologic examination of a bronchoscopically removed specimen verified the bronchoscopic diagnosis. The surgeon deemed the growth and metastases inoperable. Deep roentgen-ray therapy arrested the progress of the growth, which has remained stationary for four years.

9. Fibropapilloma with a long slender pedicle attached to the wall of the right bronchus below the level of the right upper lobe bronchus, discovered at diagnostic bronchoscopy, in a woman, age 4[illegible]. The symptoms of paroxysmal coughing, wheezing, and bubbling mucopurulent secretion led to an erroneous diagnosis of asthma. The bronchoscopic diagnosis was confirmed by biopsy. Cure of the symptoms followed peroral bronchoscopic removal. The patient was free from recurrence two years later.

10. The fungations seen at the right side of the lower-lobe bronchial orifice might be either exuberant granulations or malignant fungations. The bronchoscopic diagnosis of cancer was based on the thickened infiltrated spur between the lower and middle lobe bronchial orifices. The latter is uppermost in the illustration. The diagnosis of cancer was verified by histologic examination of a specimen removed at diagnostic bronchoscopy.

(MCCRAE, FUNK, AND JACKSON.)

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secretion to a profuse fœtid mucopurulent secretion associated with abscess formation. Hæmoptysis is frequent, and usually appears early. A large fatal hæmorrhage is rare. Dyspnœa is common and usually occurs early; it is especially marked with bronchial occlusion. Pain may be associated with pleurisy or be variously located, and sharp or dull, continuous or intermittent. There is nothing specific about the physical signs, and they vary according to the extent of the growth. The signs of obstruction are important as suggesting a bronchial origin. Fever is often absent, and when present is due to associated infections.

DIAGNOSIS.—These authors urge the importance of bronchoscopy in diagnosis. By it the area can be seen and if necessary a portion of tissue removed for examination. As with many other diagnostic problems, it is necessary to think of the possibility of a new growth. As long as we think only of the changes in the lungs supplied by an obstructed bronchus, and diagnose these without attempting to go farther back in the diagnosis, we shall fail in recognizing bronchial obstruction. The condition is a chronic one, and the diagnosis has not to be made at once; the signs are not suggestive of change in the lung or pleura alone, and they may change from day to day, especially on auscultation. The variability of breath-sounds and râles is especially suggestive. Unless the X-ray examination gives definite results a complete diagnosis can only be made by bronchoscopy (*Plate XXXI*). For bronchoscopic diagnosis the eye must be so trained as to the colour, form, and movement of the bronchi in health that any departure from the normal is at once apparent. The colour of a neoplasm may be the same as that of the normal mucosa, or may be covered by mucosa streaked with enlarged or tortuous vessels, or the colour may be distinctive—white, yellow, red, or purple. Tumours distort the normal form, or may project into the lumen and partially or completely hide the normal structures. The bronchi normally expand, contract, elongate and shorten, but with cancer there is a fixity which is striking and at once apparent.

PROGNOSIS AND TREATMENT.—With early diagnosis the prognosis may not be so hopeless as is generally thought. One patient is apparently well after three years of **Intensive X-ray Treatment,** and another after two years. Jackson in 1917 reported the endoscopic removal of an endobronchial neoplasm and the patient remains well after eleven years, and a number of apparent cures by the same method have since been reported. Such cases must remain relatively few, and success could only be possible in the earliest stages; the main dependence must be on intensive X-ray treatment. The bronchoscope will contribute to cure more often as a means of early diagnosis than as a means of removal, and it should be used in all cases with obscure pulmonary or bronchial symptoms.

REFERENCES.—[1] *Lancet*, 1927, ii, 11; [2] *Arch. of Internal Med.* 1913, March, 314; [3] *Jour. Amer. Med. Assoc.* 1927, ii, 1140; [4] *Jour. Pathol. and Bacteriol.* 1926, xxix, 241; [5] *Ibid.* 1928, xxxi, 365; [6] *Arch. of Internal Med.* 1927, Sept., 340.

LUNG, EMBOLISM OF.

W. H. Wynn, M.D., F.R.C.P.

The present opinions as to the factors predisposing to massive embolism after operation may be summarized from the report of the B.M.A. meeting at Bradford in 1924. They are (1) stasis in the veins, (2) sepsis, (3) the liberation of thrombokinase in the wound, (4) trauma, especially due to powerful retraction, causing thrombosis in the veins of the abdominal wall. In 1925 E. C. Lindsay[1] laid stress on age as an important predisposing factor. W. A. Lister[2] has made a statistical investigation to determine which of these factors, or any other, are concerned. The records of the London Hospital from 1909 to 1925 were consulted, and all cases of pulmonary embolism were taken, with the following reservations: cases alone were accepted in which the artery obstructed was not smaller than a branch to a lobe; cases of pyæmia and of heart disease in which no other source of an embolus could be found than a thrombus in the right heart were excluded; and also cases in which there was any doubt as to the embolic or primary thrombotic nature of the clot. Clinically the cases were those in which death occurred rapidly after a sudden attack of dyspnœa and cardiac failure. There were 154 cases in which no operation was performed, 195 followed operation, and 12 followed fracture. These figures must not be taken to indicate that embolism most commonly followed operation, as there are more than twice as many surgical as medical admissions to the London Hospital. The statistical analysis was confined to cases following operation. A comparison was made between these cases and a sample of 4000 cases of major operations taken from the alphabetical records and bearing the same proportion between surgical male, surgical female, and gynæcological cases as existed between the total admissions of these groups. It appeared that sex played no part as a predisposing cause, the proportion of emboli to operations in the two sexes being almost the same. Pelvic operations carried no uniformly heavy rate of incidence, and showed great variations among themselves. The two factors which appeared of importance were age and an incision into the anterior abdominal wall. In all three groups the incidence rose steeply after 30 years of age, the maximum being between 60 and 75. The evidence also strongly suggested that an operation through the anterior abdominal wall is much more likely to be followed by embolism than is any operation elsewhere, and once an incision is made in this situation the liability to embolism depends on the age of the patient, and not on the actual operation performed. Trauma to the veins of the abdominal wall does not seem to cause embolism, as operations in which these are involved do not seem to carry an undue rate of incidence. If liberation of thrombokinase predisposed to embolism, Halsted's breast operation or nephrectomy should show a high rate of incidence, but in these operations the incidence is very low. A frankly septic condition such as appendicitis does not carry an incidence higher than that suggested by the age and the site of incision, whereas the radical cure of an umbilical hernia in which there was no sepsis had a higher rate of embolism than any other operation. There was no undue incidence following operations in any unusual posture. Two other important factors appeared to be muscular action and respiration. Fracture of the femur, in which movement is reduced to a minimum, is frequently followed by embolism. As regards respiration, it is generally admitted that the commonest sources of emboli are the great veins of the lower abdomen. They accounted for 97·5 per cent of the cases with an abdominal incision and 50 per cent of the remainder. These veins are not surrounded by muscle, and depend almost entirely on respiration to maintain the blood-flow through them, and mainly upon diaphragmatic action raising the intra-abdominal pressure. When there is an anterior abdominal incision the downward movement of the diaphragm causes pain by stretching the wound, and is therefore reduced to a minimum, with consequent venous stasis. It is suggested that massage of the lower limbs and breathing exercises should be instituted at the earliest possible moment after any abdominal operation, particularly if the patient is over 40 years of age, and that similar precautions be taken in cases of fracture of the femur. They should be stopped at once if there is any suspicion that a thrombus has formed. In addition, if it is possible to perform an equally efficient operation by any other route than by way of the anterior abdominal wall—e.g., hysterectomy—this route should be adopted.

REFERENCES.—[1]*Lancet*, 1925, i, 327; [2]*Ibid.* 1927, i, 111.

LUNG, FIBROSIS OF. (*See* PULMONARY FIBROSIS.)

LUNG, POST-OPERATIVE MASSIVE COLLAPSE OF.

W. H. Wynn, M.D., F.R.C.P.

C. R. Boland and J. E. Sheret[1] have followed the convalescence of 261 patients from abdominal operations with reference to the possible occurrence of declared or latent alterations in the lungs. They hold that post-operative pneumonia is almost a chimera, and that the vast majority of all complications are massive collapses. Of 149 males 18·1 per cent showed pulmonary collapse (58 operations through upper abdominal paramedian incision 29·3 per cent; 40 with gridiron incision 17·5 per cent; 51 hernias and lower abdominal paramedian incision 6 per cent incidence). Of 112 females there was an incidence of 13·7 per cent (35 upper abdominal incisions 17·1 per cent; 42 gridiron incisions 4·7 per cent; 28 hernias and lower abdominal incisions 0: and 7 nephrectomies and nephrotomies 14·3 per cent incidence).

SYMPTOMATOLOGY.—The symptoms associated with the onset of massive collapse vary widely, and cases may be described as fulminant, moderate, or latent. In *fulminant* cases the onset is with a 'collapse attack'. A patient who may seem fairly well suddenly becomes so cyanosed, distressed, and dyspnœic that death appears imminent. At the same time the temperature and pulse-rate become very high and sweating is profuse. At the height of the attack the patient adopts a characteristic attitude, curving his body and inclining his head towards the affected side. It does not necessarily mean that an unusually large area of lung is involved. In *moderate* cases the dyspnœa and distress are variable, but fall short of the urgency of the fulminant cases. The lips are cyanosed, temperature about 100°, and the pulse-rate about 120. The *latent* cases show no symptoms, and the explanation of a temperature of 100° and a pulse-rate of 120 must be sought at the bases of the lungs. If a typical case of massive collapse, say that of the right lower lobe, is seen fourteen hours after operation, the temperature and pulse-rate are rising, the respirations are shallow and difficult, and the skin is moist. The patient may want to cough, but restrains as much as possible. The lower part of the chest is moving very little, and the immobility is especially marked on the right side. The heart is either normally placed or displaced to the right. The only physical signs in front are coarse râles, but the percussion note at the back, although not absolutely dull, has lost its resonance to a degree greater than that caused by mere postural deflation. Breath-sounds can be heard only on deep inspiration, and the vocal fremitus and resonance are much diminished. Moist sounds are conspicuous all over the lung, and X rays show a mottled appearance. Some twenty hours later the acute symptoms have almost subsided, but the cyanosis remains and temperature and pulse are reaching their maximum. At this time all moist sounds have disappeared from the normal area, but the retraction, immobility, and cardiac displacement are much more marked. Over the collapsed area the percussion note is as dull as that caused by fluid, the breath-sounds are entirely absent or heard only on the deepest inspiration. On the fourth or fifth day the temperature and pulse may return to normal, and between the third and sixth day the cough produces larger quantities of thick green, mucopurulent sputum containing pneumococci, *Micrococcus catarrhalis*, and *Bacillus influenzæ* most frequently. The bronchial obstruction is usually removed by the fifth day, after which the signs of collapse give place to those of its complications.

Radiographic Signs.—Although the physical signs are characteristic, the most striking manifestations are in the radiographic films, particularly when collapse affects the whole of one lung (*Plate XXXII, A*). The shadow cast by the airless lung is at least as dense as that caused by a thick layer of fluid, and may obscure the rib outlines. The cardiac, mediastinal, and trachea shadows are displaced to the affected side, the diaphragm is elevated, and the ribs fall together. When a lower lobe is affected, the shadow is equally dense, and occupies a triangular area which on the left side may be almost completely overlapped by the heart. Cardiac displacement may be as great as when the whole lung is collapsed, but more often displacement is slight or absent. Evidence of displacement of the interlobar septum is more important than mediastinal displacement. The first indication of collapse is a mottled appearance of the lung (*Plate XXXII, B*) developing within twenty-four hours after operation. This nearly always occurs in the lower lobes on one or both sides, and appears to be due to lobular collapse which may coalesce to form massive collapse. Nevertheless it may clear up rapidly. When the lung again becomes aerated it sometimes fails to return at once to its normal volume. (*See also* X-Ray Diagnosis—Massive Collapse of the Lung, and *Plates LXVI, LXVII*.)

Causation.—The cause of massive collapse is still unsettled. Every mechanism which could probably bring about deflation has been evoked. Boland and Sheret maintain that the one determining cause is obstruction of the bronchial tree. This is supported by experimental evidence and the clinical observations of cases in which collapse has been caused by obstruction by foreign bodies, tuberculous masses, or neoplasms. In post-operative cases rapid re-expansion of the lung has followed bronchoscopic removal of thick secretions.

In post-operative cases there are several predisposing causes. First among these is the hypersecretion caused by the general anæsthetic, or the hypersecretion of the pulmonary or cardiac condition which contra-indicated an anæsthetic. This hypersecretion is more marked in males than females, possibly owing to irritation from smoking. Secondly, the position in which abdominal patients are usually nursed tends to the gravitation of secretion into the bronchi of the lower lobes. Thirdly, there is interference with the expulsive mechanism either by voluntary suppression or by the excessive use of morphia.

Diagnosis.—Pneumonia may be justly suspected in most cases when bronchial breathing and pectoriloquy are present, but when these signs occur in a patient who shows nothing else to suggest an inflammatory lesion of the lungs the terminal stages of massive collapse must be considered. There may be little cough or sputum, no more marked acceleration of the pulse and respiration than is comparable with the general condition of the patient, and no fever. Further evidence against pneumonia is provided by the absence of any alteration in the physical signs from day to day, the often complete lack of moist sounds, and the presence of a large area of physical signs contrasting strongly with a complete absence of toxicity. Pneumonia is a rare complication of abdominal operations.

Prognosis.—Collapse, although itself of interest rather than of importance, may become grave because of complications due to infection, which may range from mere congestion to bronchopneumonia. It is rare, however, for these complications to prove fatal.

Treatment.—The immediate object of treatment must be the removal of the obstructing plug from the bronchus. This has been accomplished successfully by **Bronchoscopy**, but even in the hands of experts bronchoscopy without anæsthesia causes considerable shock and exhaustion. Turning the patient rapidly on to his unaffected side and making him cough undoubtedly acts by dislodging the obstructing mucus, and is satisfactory but necessarily somewhat violent. It does not always seem justifiable in the early stages when it is most efficacious. Its usefulness is limited to those cases in which

PLATE XXXII

POST-OPERATIVE MASSIVE COLLAPSE OF LUNG

(Boland and Shield)

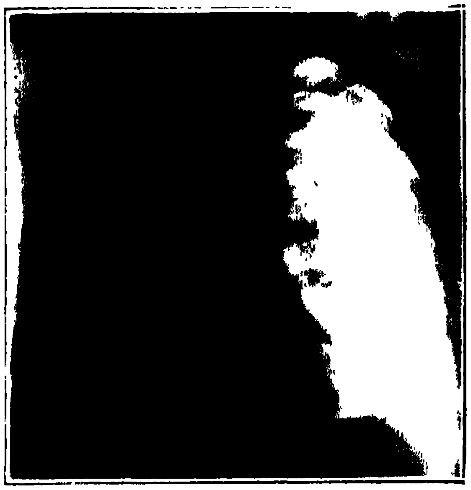

Fig. 1.—Massive collapse of whole right lung

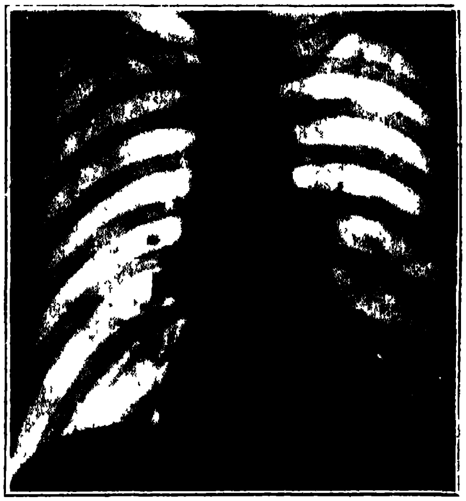

Fig. B.—Early collapse showing mottling

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PLATE XXXVIII

RHEUMATIC LUNG

Naish.

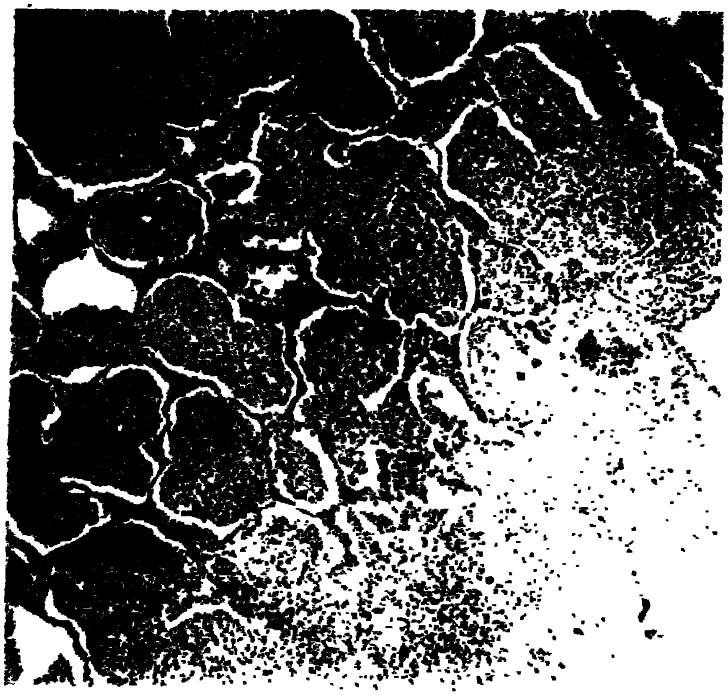

Fig. A.—Microphotograph from a typical bronchopneumonia, showing large alveolar cavities with thin walls, the cavities being nearly filled with a mass of fibrinous exudate and polymorph leucocytes slightly shrunken away from the walls. Such red blood-corpuscles as are present in the walls are nearly all contained within small vessels. (× 60.)

Fig. B.—The alveolar walls are seen to be some eight or ten times as thick as in *Fig. A*; the red blood-cells are not contained within vessels, but are widely diffused among the other cells of the walls; the cavities of the alveoli are quite small and are encroached on by small outgrowths from the walls. (× 60.)

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PLATE XXXIV

RHEUMATIC LUNG—*continued*

(NAISH)

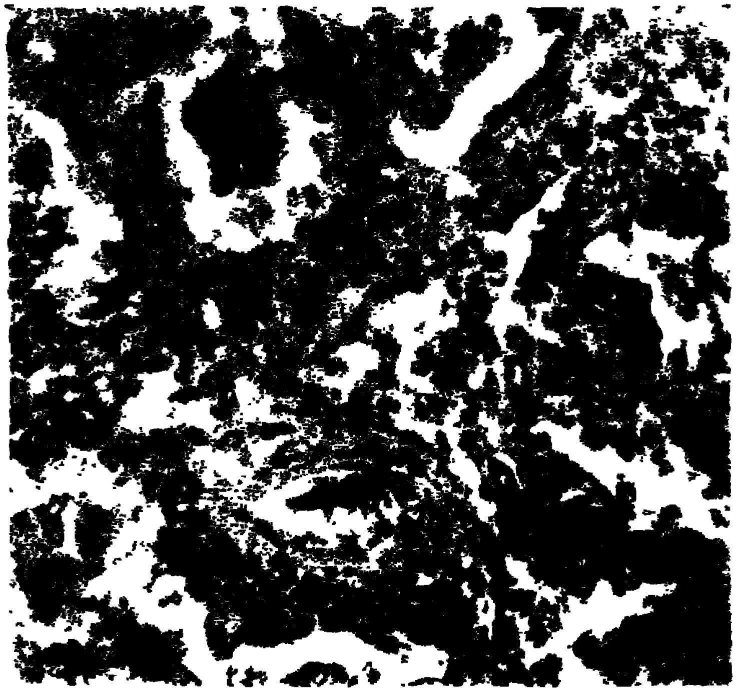

Fig. C.—Microphotograph showing (1) Proliferation of the endothelium lining a capillary; (2) Outgrowth of similar endothelial cells in all directions, so as to make it difficult to distinguish wall from cavity; and (3) General diffusion of red blood-cells among the endothelial cells. (× 280.)

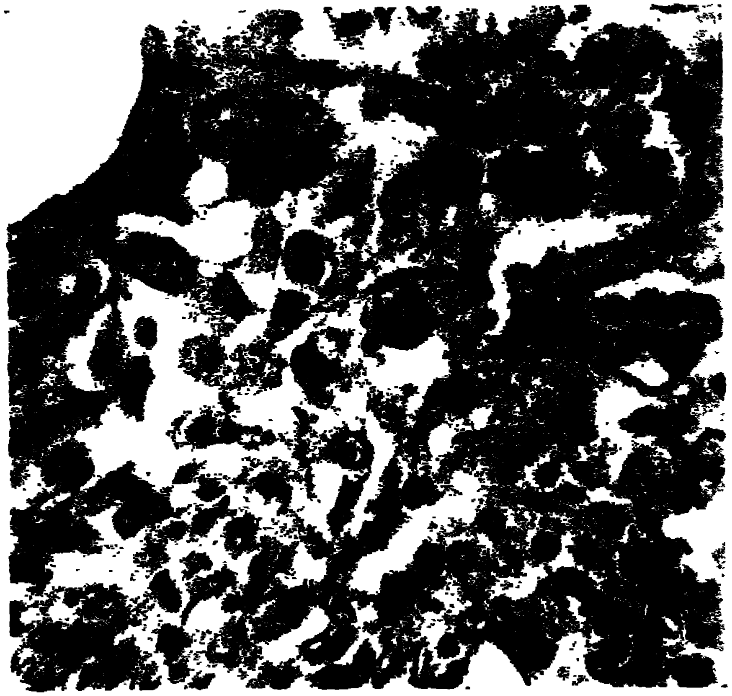

Fig. D.—Microphotograph showing in all parts of the section the characteristic large cells described by Coombs. (× 520.)

the obstruction is in the larger tubes. The authors are convinced that the treatment should be primarily prophylactic, and should consist essentially of **Postural Drainage.** In 47 male patients pillows were removed and the foot of the bed raised 20 in. above the head for twenty-four hours. None of these patients had massive collapse whilst they were in this position, and X rays showed good aeration of the lower lobes. When postural drainage cannot be attempted, morphia should be avoided as far as possible, and attempts made to increase aeration by **Forced Breathing** or the administration of **Carbon Dioxide** to produce hyperpnœa.

Reference.—[1]*Lancet*, 1928, ii, 111.

LUNG, RHEUMATIC.

W. H. Wynn, M.D., F.R.C.P.

Rheumatic pneumonia is an old term which has fallen somewhat into disuse, possibly because acute rheumatic fever in adults is now less common. A. E. Naish[1] has studied the consolidation in the lungs of 6 fatal cases of rheumatism in the light of our present knowledge of rheumatic lesions. He finds that the microscopic appearances indicate an inflammatory reactive process unlike anything hitherto described in the human lung, and that they bear a strong resemblance to the lesions described by Tawara, Carey Coombs, and Aschoff as pathognomonic of rheumatic infection in other parts of the body. Four cases were children, age 7 8, 9, and 13, and there were two adults, age 26 and 33. All gave signs of active rheumatic infection. In children suffering from rheumatic carditis more or less extensive patches of dullness are liable to appear over the back of the chest. They appear insidiously, are frequently unaccompanied by fever or noticeable increase of the respiratory rate, and are therefore only found on routine examination. Cough is mild and attracts little attention. The dullness may appear quite rapidly and extend over the greater part of a lobe in two or three days, and may then remain stationary for a long period lasting into months. Finally it may clear up as rapidly as it came. The breath-sounds are often loudly bronchial, but may be muffled or absent. During the quiescent stage there are no râles, but a few crepitations may be heard at the onset. The condition has usually been regarded as due to collapse from pressure of an enlarged heart or pericardial effusion, and as limited to the left base, but in all Naish's cases the right lung was equally involved though signs first appeared at the left base. The condition only appears in those severely affected with rheumatism, but it does not seem to add to the gravity of the prognosis, and the majority live for the signs to clear up. In the recorded 6 fatal cases the symptoms were naturally more acute, but it was remarkable how little the temperature and respirations were affected. At the post-mortem the extent of the consolidation was striking, and in some very little aerated lung was seen. The appearance was quite unlike that seen in other forms of pneumonia. The consistency was very tough and non-friable, and the colour was a purplish-red. Microscopically (*Plates XXXIII, XXXIV*) the alveolar walls were much thickened, and the alveolar cavities were small and encroached on by outgrowths from the walls. The walls contained large endothelial cells, some of which were multinucleated. The cells projected in little tufts into the alveoli, some of which were closely packed with the cells. At a later stage the endothelial cells begin to form new blood-vessels. Leucocytes were few, but red blood-cells were widely diffused among the other cells of the alveolar walls. These lung appearances are strikingly like those in cardiac submiliary nodules, the main difference being that they suggest an earlier stage of development in which endothelial proliferation overshadows fibroblastic reaction.

Reference.—[1]*Lancet*, 1928, ii, 10.

LUNG, SURGERY OF. (*See* CHEST, SURGERY OF.)

LUNG, SYPHILIS OF.

W. H. Wynn, M.D., F.R.C.P.

There is much difference of opinion concerning the frequency of pulmonary syphilis. Syphilologists regard it as common, but tuberculosis physicians as very rare. F. E. Tylecote[1] describes 16 cases, and gives reasons for estimating the incidence at about 1 per cent of sanatorium cases in this country. Of the 16 cases, 11 were males and 5 females. The average age of the males was 50·82 and of the females 47. Acquired pulmonary syphilis has five forms: (1) Syphilis pulmonum, a combination of areas of fibrosis starting from the root or base, possibly with ulcers of trachea, larynx, or bronchi, sometimes with resultant bronchiectatic or gangrenous cavities, with or without gummata (which are rare in adults); (2) Chronic interstitial pneumonia, a non-tuberculous fibroid phthisis in a syphilitic subject; (3) Syphilitic gummata: (4) Syphilitic arteriosclerosis with infarcts, pulmonary emboli, serofibrinous pleurisy; (5) A pulmonary arteriosclerosis with great œdema, described by Sir Leonard Rogers among Bengalese of 20 to 40 years of age.

SYMPTOMATOLOGY AND DIAGNOSIS.—Practically all the symptoms and signs of chronic lung disease occur in pulmonary syphilis. Dyspnœa is an outstanding symptom, and is due to peribronchial fibrosis or to bronchial stenosis. Hæmoptysis is not uncommon. A one-sided distribution, or hilar or basal rather than apical, may suggest the diagnosis, and the radiogram may show the spread of fibrosis or even of gummata directly along the primary or secondary vessels and bronchi. The mediastinal shadow may be thickened, and the heart shadow differs in shape from that in tuberculosis. In chronic cases wrongly diagnosed as tuberculous, ringed shadows and signs of calcification are absent. Evidence of syphilis in other organs is suggestive. The following are useful diagnostic points: Signs of phthisis with repeated negative examinations for tubercle bacilli. Improvement in the symptoms, especially dyspnœa and asthma, following potassium iodide given empirically. Signs marked but history long and condition stationary. Other organs involved by syphilis. Positive Wassermann reaction. Recurrent but never fatal hæmoptysis. Unusual site of lesion and abnormal course. Blood-pressure rather too high for tuberculosis or malignant growths. Bronchiectasis, or tracheal or laryngeal stenosis. Skiagrams showing fibrosis of a peculiar distribution with no calcification or ringed shadows. Chest signs with little or no loss of weight but peculiar anæmic appearance. Signs of serofibrinous pleurisy, the fluid recurring after repeated tappings. Symptoms typical of mediastinal tumour, but a Wassermann test, the effect of iodides, and the longer course exclude malignant growths.

TREATMENT.—**Potassium Iodide** gives the best results; 5 to 10 gr. three times a day are often sufficient, but where gummata are present larger doses should be given. Where there is much secretion **Belladonna** should be added. Belladonna is also useful when there is dyspnœa due to spasm. Tonic treatment is useful, and includes the **Syrup of Iodide of Iron** in 1-drachm doses, and **Arsenic**, e.g., **Fowler's Solution**, 1 to 5 min. In selected cases in which the heart condition is good **Novarsenobillon** can be given. **Mercury**, best by inunction, requires more care, but is not contra-indicated if the patient is under careful observation. For well-to-do patients a course of warm **Sulphur Baths** at Aix-la-Chapelle may be prescribed.

REFERENCE.—[1] *Lancet*, 1927, ii, 637.

LUNG, TUBERCULOSIS OF. (*See* TUBERCULOSIS, PULMONARY.)

LUPUS VULGARIS.

A. M. H. Gray, M.D., F.R.C.P., F.R.C.S.

TREATMENT.—J. Beatty[1] has tried various methods of treatment for lupus vulgaris, including the local application of pyrogallol ointment, acid nitrate of mercury, salicylic acid and creosote plaster, X rays, and the Kromayer lamp, but has obtained the most satisfactory results from an **Alkaline Phenol Mixture**, the method of preparation and application of which is as follows: "In a 4-c.c. wide-mouthed sample bottle stoppered by a rubber cap are placed 2·5 c.c. of a solution of caustic potash (1 part to 2 of water) in which is suspended precipitated chalk (1 part) and 1·5 c.c. of acidum carbolicum liquefactum. A considerable degree of heat develops. The preparation is made in small amounts, because oxidation takes place, with resulting brown discoloration after a few days' exposure to the air over the fluid. When the phial is filled this does not occur to any extent, and there is enough of the preparation to treat several patches. It is better, however, to keep the caustic potash preparation separate from the phenol and mix shortly before use. Fresh preparations are thus always conveniently available. A pencil of cotton-wool wrapped round the point of a forceps is dipped in the fluid and the area rubbed. The caustic potash dissolves the epidermis and the abrasive action of the precipitated chalk aids in its removal. As the rubbing is continued the lupus nodules start out as purple spots, and nodules not previously noted can be detected. When these purple spots are well marked the application is stopped; if it is continued the whole area will turn purplish-black. The colour appears to be due to hæmatin formation by the alkali.

"A piece of unmedicated lint is cut of the size of the area of disease, and on this is placed a fairly thick coating of a paste consisting of equal parts of salicylic acid, sodium salicylate, and cane sugar, with enough glycerin to make a soft paste. This is applied to the area treated, and the whole covered in with zinc oxide adhesive plaster, which overlaps for some distance on all sides so as to make an impervious dressing.

"There is a good deal of pain during the application of the alkaline phenol, but the anæsthetic action of the phenol soon removes this. Later in the day a fair amount of pain is to be expected, and after a day or two exudation finds its way out from under the dressing. The application is repeated twice a week, in most cases for four weeks, though not so long for superficial cases. On the removal of the first dressing a granulated surface is found, no lupus nodules being visible, but if the wound were allowed to heal some nodules would be found. Repetition of the treatment is therefore necessary, but after the first treatment touching with the alkaline phenol or slight rubbing only is required. After the last treatment the place is allowed to heal up under boric ointment."

The method requires some care in use, as in two cases excessive ulceration followed. Personal supervision of the physician and strict attention to detail are therefore necessary.

A. R. Somerford[2] recommends a modification of the well-known **Adamson Method.** The affected areas are painted with liquor hydrargyri nitratis acidus, applied on cotton-wool wrapped round a match, until coagulation occurs and the tissues become grey. The painted area is then covered with lint spread with ung. zinci containing 3 per cent carbolic acid, and the dressing is made airtight by overlapping pieces of strapping. This is left in position for forty-eight hours, and on removal ulceration is found to have taken place. The application is repeated till all the tuberculous tissue has been destroyed, when the dressing is replaced by Brooke's ointment and healing allowed to take place.

P. Degrais and A. Bellot[3] call attention to the value of **Radium** in the treatment of lupus vulgaris. They point out that radium has not the same selective action on tuberculous tissue as it has on the carcinoma cells, and that therefore the method of treatment is different. The employment of beta as well as gamma radiations is necessary. They advise for most cases the use of varnished plaques containing from 1 to 1½ mgrm. of radium element per square centimetre. Plaques varying in size from 1 to 16 square centimetres are employed by them. They differentiate, as to treatment, between (1) the button-like form, and (2) the infiltrated form, either with or without ulceration. For the former they apply the plaque without filter, but protected by a sheet of rubber, for from 1 to 1½ hours. This produces a crusted ulcer by the tenth or fifteenth day, and in six to eight weeks leaves a flat scar. For the latter form the action of the radium must be deeper, and lead filters varying from 0·1 to 0·4 mm. are employed, and the exposure is from 3 to 10 hours. Alternately platinum tubes 0·5 mm. thick, containing 5, 8, 11, or 13 mgrm. of radium element, can be used, either unscreened, or screened with 0·5 to 1 mm. of silver. The time of exposure varies from 1½ to 3 hours with unscreened tubes, or 5 to 6 hours with screened tubes. Lupus of the mucous membranes is particularly susceptible to radium treatment: tubes are employed as above, but shorter applications are advised.

F. Wirz[4] has failed to obtain success in four cases of lupus vulgaris treated with **Aurophos,** a preparation containing 27·3 per cent gold. On the other hand, in eight cases of Bazin's disease all were cleared up.

REFERENCES.—[1]*Brit. Med. Jour.* 1928, i, 47; [2]*Lancet,* 1928, i, 1173; [3]*Presse méd.* 1928, Feb. 15, 199; [4]*Munch. med. Woch.* 1927, July 1, 1090.

LYMPHADENITIS, CERVICAL. (*See* TUBERCULOUS GLANDS IN NECK.)

LYMPHADENITIS, MESENTERIC. (*See* MESENTERIC LYMPHADENITIS.)

MALARIA.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

EPIDEMIOLOGY.—Some interesting studies on malaria have been recorded during the past year. In Palestine I. J. Kligler[1] writes further on the influence of climate, and he notes that heavy winter rains with extensive coastal marshes increased the malaria in that area, but humidity had little effect. Further, anopheles have been proved to travel under certain conditions up to 3 or more kilometres and to produce epidemics, and their direct flight is about 2·5 kilometres (1½ miles). B. Mayne,[2] in India, has confirmed the finding of Bentley in Bombay and Gill in Lahore of a close relationship between the weekly mean relative humidity and the appearance of malarial parasites in the mosquitoes as shown by dissections of them, for in the United Provinces a rise of the relative humidity in August from 78 to about 99 was soon followed by the appearance of infected anopheles. H. P. Carr and J. L. Clarke,[3] in Illinois, U.S.A., found 14 per cent of enlarged spleens in children in the valley, but only 3·7 per cent in the hills, and on making a spot map they noted that nearly all the hill cases occurred within mosquito range of the valley, from whence the infections were obtained. Spot maps also revealed focal distribution of the disease indicating local causation. T. C. McCombie Young and J. D. Baily,[4] in the Coorg State in the Western Ghat mountains of India, found the breeding ground of the main carrier, *A. listoni,* to be open surface channels made to drain swamps, although the latter were not important breeding grounds—indicating that harm had been done by a mistaken policy. G. Covell and J. D. Baily,[5] in the Andamans, have made careful spleen measurements in adults by Christophers' method, and also parasite counts in blood films, their results being similar to those found by others in children, namely, that in both the percentage of parasite infections increases as the spleen enlarges. S. P. James, W. D. Nicol, and P. G. Shute[6] record having induced artificial malaria by inoculating serum and Locke's solution extracts of anopheles salivary glands infected with malaria sporozoites, and they found that the addition of a 1–5000 solution of quinine bisulphate to the serum did not prevent infection.

PROPHYLAXIS.—The Malaria Commission of the League of Nations has issued a second report on antimalarial methods in Europe[7,8] in which they point out that in only very rare and exceptionally favourable instances can the disease be eradicated, so it is usually unwise to aim at more than a significant reduction. Malaria has died out of parts of Europe with improved social conditions, although the anopheline carriers remain. They regard as the most practical measures in Europe those designed to kill the parasites in man by quinine or cinchonine treatment, and in the carriers by killing infected anophelines in houses. The old Indian **Cinchona Febrifuge,** if standardized, is the cheapest effective remedy, and should be more extensively employed. As in Europe, at any rate, most of the infected mosquitoes are found in the houses, the occupants should be taught to destroy them and to abolish dark, dirty corners in which they hide. Still further research is required. H. B. Newham[9] records a letter from a lady in India stating that mosquitoes can be prevented from biting by the simple expedient of rubbing the cut surface of the **Lime Fruit** on the arms and legs and allowing it to dry.

Quinine prophylaxis is dealt with by P. E. McNabb and T. H. Stewart[10] in Panama, and they agree with recent work that under field conditions 15 gr. every evening while living in a highly malarious area will not prevent infection, but it will suppress the disease and enable urgent necessary work to be carried through, so it is of immense value, especially under military conditions. It is more effective against the dangerous malignant tertian than against the benign tertian form. K. Comyn[11] has studied malaria in Egypt, and agrees with the Egyptian Antimalarial Commission that the disease cannot be completely stamped out there, so treatment of infected cases is a most important measure. In a regiment under strict supervision the prophylactic administration of quinine to those exposed to infection, as in men on night guard near infected villages, and prolonged treatment of all infected men, are of great practical value, and served to reduce the disease in a cantonment by six-sevenths in four years. K. Bose,[12] in the very malarious Bengal municipality at Birnagar, also found the use of quinine the most valuable antimalarial measure, and obtained a reduction of the spleen rate in the children from 67 to 33 per cent in one year. I. Mackenzie[13] has found 5 gr. of quinine daily failed to prevent malaria, but 10-gr. doses reduced the incidence as much as 40 per cent in one instance.

TREATMENT.—**Quinamine** is an alkaloid present in small quantities in cinchona bark, and R. N. Chopra and J. C. David[14] found that it has a stronger action on the uterus than the other alkaloids; they think therefore it may show oxytocic properties if present as an impurity with quinine, or in cinchona febrifuge. The same workers, together with B. B. Dikhit,[15] have studied the action of **Cinchonidine** and of **Cinchonine** on the hearts of animals and found that the first named was the more depressant. A further study[16] showed that although quinamine in dilutions of 1–500,000 caused contraction of the uterus, quinine and quinidine were somewhat less powerful and cinchonidine had the least action of the cinchona alkaloids. Quinine acted most powerfully on the pregnant uterus near term, but had little effect in the earlier stages of pregnancy; this is in accordance with clinical experience. The frequent *failure of quinine* in India due to hospital and dispensary mixtures not containing nearly the prescribed amounts has been further investigated by J. W. D. Megaw and S. Ghosh[17] by analyses of 90 solutions taken without previous notice, of which 25·5 per cent were 25 per cent or more below strength, and 9 of them were 50 per cent or more deficient. A simple test has been worked out for detecting such serious deficiencies as follows: A stock solution of 20 grm. of Merck's pure phosphotungstic acid in 100 c.c. of 12·5 per cent sulphuric acid is used, and 2 c.c., or two parts, is added in each of two narrow test-tubes, 5 to 7 mm. in diameter, and of equal calibre, to 1 c.c., or one part, of the stock solution, and to the same amount of a freshly prepared solution of the right strength. Allow the precipitates to stand for two to three hours, when any great variations between the two will indicate an analysis to detect the amount of the deficiency.

Stovarsol has been further tested in benign tertian malaria by J. A. Sinton[18] in the form of the sodium salt intravenously in 1 to 1·5 grm. doses in 10 c.c. sterile distilled water up to a total of 4 grm. in five days, but although a clinical cure was obtained in a few days in most cases, a true cure only resulted in a very small proportion, as 92 per cent relapsed. A further trial[19] of **Quinine-Stovarsol,** which contains about equal quantities of both drugs, was made in two doses daily, totalling 8 gr. of stovarsol and 7 gr. of quinine a day for twenty-eight days. Sodium bicarbonate 30 gr., sugar 30 drachms, and magnesium sulphate 60 gr. daily were also given to lessen the toxic effects of the arsenic. The results were rather better than with sodium-stovarsol, the relapse-rate being 60 per cent, but this was higher than with control series treated with quinine or cinchona alone. The first dose should be a small one, as the provocative action of stovarsol may produce severe toxic symptoms.

Further trials of **Plasmochin** have yielded somewhat variable results. J. A. Sinton and W. Bird[20] found plasmoquine, containing 0·1 grm. plasmoquine and 0·125 grm. quinine sulphate compound, preferable to the pure drug; they gave those doses daily for seventeen to twenty-eight days, with intervals when any toxic symptoms appeared, or from 0·05 to 0·1 grm. of the pure drug according to the patients' weight was given at intervals or continuously. In benign tertian malaria with the compound drug the relapse-rate with intermittent treatment was 20 per cent, but with continuous treatment nil in a small series of cases, which is much less than with quinine or cinchona febrifuge. The pure drug has less effect than quinine in reducing temperature quickly, and had no greater effect on the spleen. In malignant tertian malaria they found with others that the ring asexual parasites are not destroyed, but the crescents are destroyed more rapidly. The drug is toxic, and the treatment had frequently to be interrupted in 22 of 29 patients on this account; 4 patients out of 29 could not complete the treatment, and 2 were dangerously ill. The margin of safety is thus small, and at least three deaths have already been recorded, so they do not advise the use of the drug except under skilled hospital treatment. Plasmochin has been tested in bird malaria by R. Hegner and R. D. Maxwell,[21] who found it greatly reduced the parasites but did not cure, as relapses occurred. W. Fletcher and K. Kanagarayer[22] have tested this drug in 97 malarial cases at Kuala Lumpur, but only the immediate effects could be studied, as the patients will not remain long in hospital. The effect in removing the benign tertian parasites and the fever was good in doses of 0·06 grm. of plasmoquine daily, as the weights of their patients were low, and it was also effective in ten quartan cases, but disappointing, as usual, in malignant tertian ones except in reducing the crescents. Toxic symptoms were frequent, and alarming in two cases, so it should only be used in hospitals under careful control. P. Manson-Bahr[23] reports further on the selective action of plasmochin compound on the sexual stage of both benign tertian and malignant tertian malaria, and thinks the two drugs are more efficient than quinine alone. G. C. Low,[24] however, has also tried plasmochin and is not convinced that the new drug is superior to quinine together with iron and arsenic, while it is much more dangerous.

Mercurochrome has been tried in malaria intravenously by G. R. Ross[25] in cases showing idiosyncrasy to quinine, especially in 5 c.c. doses of a 1 per cent solution on alternate days up to three doses, and although it did not have any marked or lasting effect on malignant tertian malaria, and relapses occurred, he thinks it is of some value in cases with threatened hæmoglobinuria after quinine. **Peracrina 303** has been tested in benign tertian malaria by J. A. Sinton and W. Bird[26] in the doses recommended by the company making it, and they found it to have little or no value, while its cost and the length of treatment required make it unsuitable for use as compared with quinine.

Blackwater Fever.—J. W. W. Stephens[27,28] tabulates the literature on the prevalence of blackwater fever in Europe, with the largest number of recorded cases in Greece and Italy, and he gives similar data for South-west Asia, with most cases in Palestine and in Transcaucasia. G. D. H. Carpenter[29] records a case in a native of Uganda.

E. Burke[30] records a case of blackwater fever in which an intravenous injection, as advised by Hanschell, of 150 gr. of **Sodium Bicarbonate** in a pint of sterile water was followed by rapid diuresis and recovery.

References.—[1]*Amer. Jour. Trop. Med.* 1928, March, 183 ; [2]*Ind. Jour. Med. Research*, 1928, April, 1067 ; [3]*Amer. Jour. Trop. Med.* 1928, May, 249 ; [4]*Ind. Jour. Med. Research*, 1928, Jun., 745 ; [5]*Ibid.* 1927, Oct., 309 ; [6]*Trans. Roy. Soc. Trop. Med and Hyg.* 1927, Nov., 233 ; [7]*Lancet*, 1927, ii, 522 ; [8]*Brit. Med. Jour.* 1927, ii, 340 ; [9]*Trans. Roy. Soc. Trop. Med. and Hyg.* 1928, Feb., 427 ; [10]*Amer. Jour. Trop. Med.* 1927, Nov., 357 ; [11]*Jour. R.A.M.C.* 1927, July, 14 ; [12]*Calcutta Med. Jour.* 1927, Dec., 285 ; [13]*Jour. Trop. Med. and Hyg.* 1927, July 15, 205 ; [14]*Ind. Jour. Med. Research*, 1927, Oct., 343 ; [15]*Ibid.* July, 125 ; [16]*Ibid.* 1928, Jan., 571 ; [17]*Ind. Med. Gaz.* 1928, May, 244 ; [18]*Ind. Jour. Med. Research.* 1927, Oct., 287 ; [19]*Ibid.* 1928, Jan., 597 ; [20]*Ibid.* July, 159 ; [21]*Amer. Jour. Trop. Med.* 1927, Sept., 279 ; [22]*Ind. Med. Gaz.* 1927, Sept., 499 ; [23]*Lancet*, 1928, i, 25 ; [24]*Ibid.* 259 ; [25]*Jour. Trop. Med. and Hyg.* 1927, Oct. 15, 257 ; [26]*Ind. Jour. Med. Research*, 1927, Oct., 277 ; [27]*Ann. Trop. Med. and Parasitol.* 1927, Dec., 237 ; [28]*Ibid.* 1928, June, 53 ; [29]*Trans. Roy. Soc. Trop. Med. and Hyg.* 1927, Nov., 237 , [30]*Ind. Med. Gaz.* 1928, March, 130.

MALTA FEVER.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

The relation between *M. melitensis* of Malta fever and Bang's *B. abortus* of cattle disease is discussed by C. Cerruti, who, after failing to find clear points of differentiation between the two, has attempted to cut the Gordian knot by holding that in countries like Piedmont in Italy any human infection evidently connected with epizootic abortion is due to the *M. melitensis*, and not to the bacillus of Bang. E. H. Haddon[2] records earlier work at the Entebbe Laboratory, Uganda, in which it was found that prolonged subculture on somewhat unfavourable media, such as simple peptone agar, led to subcultures of *M. melitensis* and *B. abortus* being easily distinguishable by the latter only (with one exception) giving a tenacious sticky growth on agar. W. W. Watkins and G. C. Lake[3] describe an epidemic of Malta fever in Arizona, U.S.A., in 1922, due to infected milk of Angora goats, for 21, or 18·3 per cent, of 115 samples of goats' serum gave agglutination reactions with the *M. melitensis.*

The treatment of Malta fever with **Mercurochrome 220** intravenously is reported on by G. R. Ross and A. P. Martin[4] in Rhodesia, as suggested by Balfour, and they found that a dose of 10 c.c. of a 1 per cent solution should not be exceeded if severe reactions are to be avoided, and the intervals between the doses should be from three to seven days. They sum up their results in nine cases by saying that no very visible proof has been produced that the drug is likely to be of value, and the verdict must be one of not proven.

References.—[1]*Jour. Trop. Med. and Hyg.* 1927, Sept. 25, 230 ; [2]*Trans. Roy. Soc. Trop. Med. and Hyg.* 1927, Nov. 25, 221 ; [3]*Jour. Amer. Med. Assoc.* 1927, Nov. 5, 1581 ; *Jour. Roy. Soc. Trop. Med. and Hyg.* 1927, July 1, 165.

MEASLES.

J. D. Rolleston, M.D.

ETIOLOGY.—R. Degkwitz[1] has found that the virus causing measles can be kept alive for several weeks outside the human body if the blood is taken from the patient just at the beginning of the eruption and diluted in proportion of 1–7 to 1–10 with buffered salt solution containing the same number of anions and cations and showing the same pH as blood. The mixture must be kept at a temperature of 0° C. Measles produced by subcutaneous inoculation begins earlier than natural measles or measles following artificial inoculation of the respiratory mucous membrane, and the symptoms are milder and of shorter duration. There thus seems to be an analogy between morbillization against measles and variolation against small-pox. Measles can be produced in man by the sterile blood of a measles patient or with dilutions of such blood which have passed through a Berkefeld filter. Degkwitz states that measles virus can be grown in culture media containing plasma from susceptible or immune persons diluted in a proportion of 1–6 or 1–7 with buffered normal saline. To keep the virus alive it must be associated with living cells, such as the slowly-growing bacteria regularly found in measles. Injection of sterile filtrates of cultures into human beings can produce reactions similar to measles, the specificity of which can be proved by the fact that such persons are later immune to large amounts of infectious blood. Monkeys (*Macacus rhesus*) can be infected by injections of such material, and the specificity of the reactions can be proved by the fact that their serum collected after the reaction can protect human beings against measles, while that of normal monkeys does not.

W. E. Cary and L. A. Day[2] made cultures on sheep-blood agar from the tonsillar area of 95 cases of measles in the early eruptive stage, and in 93 (98 per cent) found a green-producing aerobic Gram-positive diplococcus which was usually the predominating organism. It varied in size, and there was reason to believe that there were forms small enough to be filter-passers. Smears from the throat of early measles cases showed a predominance of the diplococci. Intratracheal or intravenous injection of the filtrate from throat washings into rabbits caused a febrile response and a definite erythema or macular rash, but some rabbits were apparently not susceptible. About 50 per cent of measles patients showed green diplococci in the conjunctival secretions during the first forty-eight hours of the rash. In 5 out of 15 cases studied, blood cultures were positive, showing a green diplococcus similar to that found in the throat and conjunctival secretions. The organisms were facultative anaerobes. Seven strains produced febrile reactions and rashes in rabbits when injected intravenously seven to thirteen days after inoculation. Salicin appeared to be of value in differentiating the measles diplococcus from *Streptococcus viridans* in that 34 out of 35 measles strains fermented salicin, whereas only 2 of the 10 normal *Streptococcus viridans* strains had this effect.

PATHOLOGY.—F. Redlich and Z. Maternowska[3] examined the *blood* of 22 cases of measles and came to the following conclusions: During the incubation period there is often a rise in the number of leucocytes accompanied by an increase of the eosinophils; in the prodromal stage the total number of white cells falls, and there is at the same time a relative increase in the monocytes. During the eruptive period the diminution in the number of leucocytes persists and the percentage of monocytes falls to normal. At the beginning of convalescence the leucocytes are normal or slightly increased in number, and there is a rise in the number of eosinophils, plasma-cells, and monocytes. Not infrequently, however, the blood-picture differs from that just described owing to such factors as constitutional peculiarities, age, recent disease, intestinal parasites, and, last but not least, the character of the particular epidemic. The writers conclude that examination of the blood in measles may be of value, but that in doubtful cases the diagnosis must be guided mainly by clinical considerations.

SYMPTOMS AND COMPLICATIONS.—E. Friedman[4] alludes to the paper on *enlargement of the spleen* in measles by Bleyer, who found this condition in the majority of 400 cases of measles at all ages (*see* MEDICAL ANNUAL, 1927, p. 289), and records his own observations on 116 cases. In only fourteen instances (12 per cent) was any enlargement found, and in four it was so slight that it would easily have escaped detection under normal circumstances. Not a single example of enlarged spleen was found in the severest attacks or in patients with the ordinary complications of measles. The enlargement was most pronounced in the younger children. Its degree was independent of the stage of the eruption, and its frequency was about as great during the early stage as at the height of the eruption. The enlarged spleen, therefore, does not appear to be either a prominent or frequent occurrence in measles at any stage.

According to E. Urbantschitsch,[5] *suppurative otitis media* is a relatively frequent complication of measles, its frequency ranging from 5·1 to 15·4 per cent of all forms of acute otitis. He records his observations on measles otitis during the fourteen years that he has been otologist at the Francis Joseph Hospital in Vienna, which has a large department for infectious diseases. From 1913 to 1919 there was not a single case of measles in which the mastoid had to be opened, but during the epidemic of October, 1919, to March, 1920, the operation had to be performed 20 times, in 8 cases on both sides and in 4 on one side only. All the patients were under 7 years of age, and with one exception, in which staphylococci and Gram-positive bacilli were found, all showed streptococci. All recovered except one who died of pneumonia secondary to tuberculosis of the mastoid. Another severe epidemic of measles occurred in October, 1926, and lasted until the following April: 14·5 per cent of the cases developed otorrhœa, which in 12 led to operation (in 9 on both sides and in 3 on one side only). All were under 6 years of age except one of 16. In 11 the operation was performed between the third and eighth week of disease, and in one at the end of the first fortnight. In the last case *Streptococcus hæmolyticus* was found, and in all the rest *Str. pyogenes*. All made an uneventful recovery except one who developed pneumonia. Urbantschitsch concludes that measles mastoiditis on the whole runs a favourable course, though occasionally necrosis, tuberculosis, and involvement of the lateral sinus take place.

J. Boisseric-Lacroix and J. Malaplate,[6] who record an illustrative case, remark that apart from convulsions at the onset *nervous complications* in measles are very rare. [This accords with the reviewer's experience.] The age at which they are most frequently observed is from 2 to 7 years, but Bourne has recorded a case in an infant of 14 months, and Dieulafoy, Lagane, and Lemierre have seen cases in adults. They are frequently accompanied by pulmonary congestion and bronchopneumonia. They may develop in the eruptive stage or late in convalescence. The writers' case is the first example on record of meningo-encephalitis developing in the period of invasion. The writers adopt the following classification of the nervous complication of measles: (1) An upper or cerebral form which chiefly occurs in severe cases and is characterized by stupor, coma, and convulsions which are bilateral or predominant on one side of the body; (2) An intermediate form in which ocular manifestations, ataxia, and bulbo-pontine symptoms predominate; (3) A lower or spinal form; (4) A mental form; (5) A meningeal form. The post-mortem appearances of encephalitis in measles do not differ from those of acute encephalitis due to other causes.

F. Reiche[7] records three cases of *serous meningitis* in children aged 14, 3½, and 7 respectively. The first two recovered and the third died. Twenty-seven lumbar punctures were performed in the first case, and 15 in the second during convulsive attacks. In both cases the cerebrospinal fluid was always clear, sterile, and under high pressure, while the cell content hardly exceeded the normal. In one case there was a slight increase in the cerebrospinal sugar and a high residual nitrogen and chloride content, especially when compared with the blood findings. Apart from bilateral otitis media nothing else abnormal was discovered.

During a recent epidemic of measles J. v. Petheö[8] observed 7 cases which developed *erythema nodosum* in convalescence. In view of the fact that measles activates latent tuberculosis, the appearance of erythema nodosum may be regarded as evidence of tuberculosis, especially as X-ray examination showed changes in the hilus glands in these cases.

F. Rost[9] records an example of the rare association of *appendicitis and measles*. The patient was a girl, age 4 years, who six days after the onset of measles, while the eruption was still well marked, developed symptoms of appendicitis. Operation was not performed until the twelfth day, when a circumscribed abscess was evacuated. Complete recovery took place in another ten days.

ISOLATION PERIOD.—In opposition to Redlich, who recently maintained that measles ceased to be contagious when the eruption was fully developed, i.e., twenty to twenty-four hours old, F. Goebel[10] brings forward the following clinical and experimental facts: (1) *Clinical*: (*a*) A child who had not had measles was put in a room with another in whom the eruption was fully developed, and at the same time was inoculated with 4 c.c. of convalescent measles serum. The first child, in whom all other sources of infection could be excluded, developed typical modified measles after the usual incubation period. (*b*) An infant who had not had measles came in contact with another child in whom the eruption of measles had appeared four days previously. Fourteen days later the infant developed measles without having been exposed to any other source of infection. (2) *Experimental*: 4 c.c. of serum was taken from a child on the second day of the eruption, and after it had been mixed with 1 per cent yatren and placed in the ice chest for 72 hours to reduce its virulence, it was injected intramuscularly into a child 3 years of age who had not had measles. After an incubation period of ten days the child developed a typical though uncomplicated attack of measles, and other children who had been in contact with it also developed a modified attack after a prolonged incubation period in spite of an injection of adult blood.

On the other hand, H. Schönfeld[11] reports that it has recently been the practice at a Berlin orphanage to transfer measles patients to the general ward six days after the appearance of the eruption, not excepting cases of bronchopneumonia. In no instance of more than a hundred children so disposed of did infection occur in the general ward. The advantage of this procedure has been that three times as many cases can be admitted to the measles ward as before in a given period.

PROPHYLAXIS.—R. Tunnicliff and B. White[12] immunized a horse by subcutaneous injection of broth cultures of the green-producing diplococcus which Tunnicliff regards as the agent of measles (*see* MEDICAL ANNUAL, 1928, p. 282), and when a basal immunity was established injected living diplococci according to the method described by Dochez for producing scarlet-fever antitoxin. The serum was concentrated, and when tested in both concentrated and unconcentrated forms was found to contain opsonins, and to produce neutralizing protective effects specific for this diplococcus. Injection of children previously exposed with this serum apparently gave complete protection in a few cases, incomplete protection in some, and no protection in others. Further clinical tests are being made with the concentrated serum.

L. J. Halpern[13] reports on 50 measles contacts who had been given an antibacterial and antitoxic serum from goats which had been immunized with Tunnicliff's diplococcus. Five died three to ten days after inoculation, not of measles but of the disease for which they had been admitted (pneumonia or malnutrition). Of the remaining 45, 28 (63 per cent) entirely escaped an attack, and most of the 17 who developed the disease had it in an attenuated form. None had any complication or serum reaction.

C. Wesselhoeft and F. F. Gordon[14] proved that single doses of 5 c.c. of convalescent measles serum were effective in controlling an epidemic of measles in scarlet fever and diphtheria wards by the following experiment: Among 76 patients exposed, 25 controls were given no serum and all developed measles, which in 16 was severe, while of the remaining 51 who were given serum, only 14 (27·4 per cent) contracted the disease, which was severe in only one case. Bronchopneumonia occurred twice in the control group and only once in the group treated with serum.

During an outbreak of measles in a children's hospital, G. Salvioli[15] carried out the following prophylactic methods: (1) 16 children were injected with whole milk, the average dose being 5 to 10 c.c.; (2) 9 children were given normal horse serum or diphtheria antitoxin in doses ranging from 20 to 70 c.c.; (3) 17 were injected with convalescent measles serum in doses ranging from 15 to 27 c.c. The results were as follows: All the children belonging to the first two groups developed typical measles, which in 3 was complicated by bronchopneumonia and 2 died. On the other hand, 9 of the 17 cases treated with convalescent serum escaped measles altogether, and the rest had only mild attacks.

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MEDICO-LEGAL WORK AND CORONERS' CASES. (*See* CORONERS' CASES.)

MENINGITIS, PNEUMOCOCCUS.

Sir James Purves-Stewart, K.C.M.G., C.B., F.R.C.P.

Instances of recovery from pneumococcus meningitis are admittedly exceedingly few. For example, J. A. Kölmer,[1] in 1920, went so far as to say that in his series of 14 cases, in which the meningitis was secondary to middle-ear or to accessory nasal sinus infection, the mortality was 100 per cent, in spite of treatment by spinal punctures together with intraspinal injections of antipneumococcus serum. He was frankly sceptical of the few recorded recoveries, for in his own experience he had been unable to accomplish anything beyond a short prolongation of life. Moreover, in two patients who were supposed to have recovered from so-called pneumococcus meningitis, he himself found that the meningococcus, and not the pneumococcus, was the true causal organism. He therefore suggested that many of the reported cures in pneumococcus meningitis were instances of mistaken diagnosis.

A careful study of the literature, however, reveals a small series of undoubted cases in which reliable bacteriological examinations have demonstrated the pneumococcus as the causal organism and yet recovery has occurred, whether spontaneously or in response to treatment. A. Netter and E. Césari,[2] in 1923, reviewed two series of cases. In their first series they found records of 8 recoveries in 42 cases; in the second series 6 recoveries in 60 cases. P. J. Parkinson[3] records a case of recovery from meningitis that developed in the course of a pneumonia; as the pneumonia slowly began to resolve, so also did the meningeal symptoms subside. Cases like these encourage us to adopt a less pessimistic outlook and to discount the common belief that pneumococcus meningitis is necessarily fatal.

An instructive case recorded by J. H. Globus and J. I. Kasanin,[4] of Boston, shows how courageous treatment may sometimes rescue a patient.

A boy of 15, following an otitis media, developed typical signs of meningitis. Lumbar puncture yielded turbid fluid, containing 12,000 cells per c.mm., nearly all polymorphs. Smears and cultures showed a pure growth of pneumococcus of the Group IV type. Blood cultures remained consistently negative. Frequent lumbar punctures were carried out, three times a day for ten days. One intraspinal injection of antimeningococcus serum was given on the first day, but as soon as the true pneumococcal organism was identified, serum injections were abandoned and intensive drainage of the subarachnoid space was continued. At the end of two weeks the patient's symptoms suddenly became aggravated, the temperature rose still higher, and no fluid could be obtained by the lumbar route. This being attributed to the formation of adhesions, cisternal puncture was done and withdrew 50 c.c. of turbid fluid containing 960 cells per c.mm., 76 per cent of which were polymorphs. The cisternal punctures were repeated and large quantities of fluid were withdrawn. The temperature gradually fell to normal and the cerebrospinal fluid became sterile. In spite of the clinical improvement the patient continued to have a mild rise of temperature in the afternoons, to 101°. Accordingly four successive and increasing doses of staphylococcus vaccine were given within a week, each injection being followed by a febrile reaction. From that time onwards the patient became afebrile and his convalescence progressed to complete recovery.

J. Harkavy,[5] of New York, records a similar serious case in which recovery followed repeated cisternal punctures together with intracisternal and intravenous administration of antipneumococcus serum on two successive days. After the first injection of serum the cerebrospinal fluid, although still turbid and containing considerable numbers of cells, became sterile. Ten days later a serum rash appeared. Improvement then continued uninterruptedly, and the patient was discharged from hospital perfectly well.

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MENOPAUSE, THE.

Beckwith Whitehouse, M.S., F.R.C.S.

Recent researches by J. H. Hannan[1] have brought to light some interesting facts regarding the symptoms commonly associated with the menopause, particularly the so-called 'flushings'. From his experiments it would appear that the sympathetic nervous system of women at this epoch is in a condition of increased tonus, and that this is the result of unbalanced action by the suprarenal glands. Hannan found that intravenous injection of 10 min. of a 1-1000 solution of adrenalin chloride in the subjects of menopausal flushing gave rise in all cases to an immediate attack of flushing. This was not the case after control injections of pituitrin or normal saline. Loewi's[2] reaction (dilatation of the pupil following instillation of adrenalin into a conjunctival sac) occurred in 40 per cent of women at the menopause upon whom the experiment was tried, the reaction being constant on eight consecutive days. Normally no dilatation of the pupil occurs, owing to destruction of the adrenalin. Hannan in his experiments proved by systematic examination of the urine that pancreatic disease was not the cause of the positive Loewi reaction. It would appear, therefore, that flushings of the menopause are caused by an increase in the tonus of the sympathetic nervous system resulting from absence or deficiency in the restraining influence of an ovarian hormone. Thyroid extract is frequently used at the menopause. Hannan points out that the intensity of menopausal symptoms is commonly increased and not diminished by the administration of thyroid at this time. This is to be expected if the internal secretion of the thyroid sensitizes the body-cells to the action of adrenalin, as suggested by Goetsch.[3]

An interesting and practical corollary to this work lies in the contra-indication of chloroform as an anæsthetic during the menopause. If, as appears to be the case, a state of sympatheticotonia exists at this epoch, then chloroform anæsthesia is not unattended with risk. Syncope during the induction of anæsthesia by chloroform is associated with fibrillation of the cardiac ventricles in which the sympathetic nerve-supply is involved. A. R. Cushny[4] considers that increased secretion of the suprarenal glands may be a factor, and therefore, as Hannan points out, chloroform should not be used as an anæsthetic at the menopause.

REFERENCES. [1]*Brit. Med. Jour.* 1927, ii, 14; [2]*Wien. klin. Woch.* 1907, 717, [3]*New York Med. Jour.* 1922, cxv, 330; [4]*Pharmacology and Therapeutics*, 209

MENORRHAGIA. (*See* UTERUS, AFFECTIONS OF.)

MENTAL DISEASES. (*See also* DEMENTIA PARALYTICA.)

Henry Devine, M.D., F.R.C.P.

MEDICO-LEGAL PSYCHIATRY.

Induction of Abortion in Relation to Mental Disease.—This question was referred to in the MEDICAL ANNUAL of 1928, p. 291, but since it is one of much practical importance, it would appear to be useful to give an outline of the views of R. P. Smith,[1] who has had many times to give a decision as to whether a pregnancy should be terminated on account of mental disorder. The cases about which he has been consulted are divided into two groups: (1) Cases in which the pregnancy was allowed to continue; (2) Cases in which the pregnancy was terminated before viability of the child.

The first case in the first group is of interest in that it shows how acute insanity may run its course during the whole of pregnancy and be recovered from, and how pregnancy may be masked by the fact that the cessation of catamenia is a frequent occurrence in acute insanity; when it became evident that the patient was advanced in pregnancy it seemed justifiable to allow it to continue. In the second case it appeared as if the continuance of the pregnancy might be associated with a very severe attack of melancholia, with great risk of suicide, and, therefore, premature labour might be justifiable. It was decided to watch events. Shortly after this the patient wrote, saying that she had thought over the matter further, and was very thankful for having talked it over, and that she had now decided to let the pregnancy go on. The third case was that of a patient who had previously injured her pelvis in a suicidal attempt, and who later became pregnant and insane. Neither husband nor wife desired the termination of the pregnancy. A living child was delivered after Cæsarean section had been performed—an operation which an improved mental condition made possible. The fourth case was also that of a woman with a contracted pelvis, who became seriously depressed and agitated during pregnancy. Her condition greatly improved, and labour was induced in the middle of the ninth month; a female child was born, and the patient became quite happy nursing it. The fifth case was that of a seriously unbalanced woman, who thought she ought not to have any more children owing to a bad heredity. In view of the previous history of normal labours it was decided that there was no justification for the termination of pregnancy. In the sixth case the patient was nearly six months pregnant when first seen. There was the complication first of severe vomiting and then of toxic myelitis; but when seen her mental condition did not suggest irrecoverability, and she was in no way dangerous to herself or others. Eventually she was delivered of a stillborn child at full term. The seventh case showed no justifiable reason, either physically or mentally, for terminating the pregnancy.

The notes of ten cases are recorded in which the pregnancy was terminated. With regard to this group, it may be said that in each case the question of the health of the mother was the primary factor, as in all the cases the child was not 'viable'. As clinical notes of all these cases are given, it is of value to consult the original article. It gives useful indications for the kind of conditions in which the termination of labour would seem to be indicated. Smith agrees with the views expressed by Fairbairn at the joint meeting of the Medico-Legal Society and the Section of Obstetrics of the Royal Society of Medicine, that only purely medical considerations should be allowed to weigh in deciding as to termination of pregnancy.

It is interesting to note the views expressed by legal authorities in the discussion.[2] For instance, Lord Riddell is reported to have said that " induction was not only justifiable, but a duty when the pregnancy indicated grave danger to the mother's health, whether the result was likely to be permanent or not ". Sir Travers Humphreys said the practitioner " was not entitled to let anything weigh with him except the health of his patient—her medical welfare as distinct from her social or economic welfare ". Earl Russell is reported as leaning to the German view which Lord Riddell had quoted, " in which it was insisted that the fœtus was not yet an independent human being, and that every woman, by virtue of the right over her own body, was entitled to decide whether it should become one ". Mr. Justice Salter, in summing up the debate, is reported as having said that if abortion were ever sanctioned outside the medical area—in the interests of eugenics, for example, or for economic, social, or personal reasons—he would have great fear that within the medical area there would arise a large class of pliant doctors who would be easily persuaded that there were sufficient medical reasons in a given case. He was certain that if it were ever proposed to extend the liberty of abortion, the spirit of unswerving opposition would arise again as it did in the attitude of the early Christian Church towards abortion.

Criminal Procedure in America.—Hamblin Smith[3] reports that interesting information has arrived from America relating to a proposed revolutionary alteration in criminal procedure, which has been brought forward by Governor Alfred E. Smith, of New York State. The scheme may be summarized as follows: (1) The jury, in a criminal trial, should determine only the guilt of the accused person. (We presume that this means the determination of the commission of the act. For in America, as in this country, the establishment of a criminal intention, technically known as *mens rea*, is essential if the act is to constitute a crime.) (2) The jury having returned a verdict of 'Guilty', the duty of passing sentence is to be taken out of the judge's hands and given to a special State Board. This Board will consist of legal experts, psychiatrists, and penologists. The members of the Board are to be whole-time officials, and will be paid at the rate of £5000 per annum each. (3) The Board will determine whether the convicted person should go to a mental hospital or to a prison. In the latter event, the Board will decide the length of the period of imprisonment, and the conditions of possible release on parole. These proposals involve a change in the State constitution. Pending such change, Mr. Smith recommends that funds should be provided by the Legislature in order that a full investigation of the question may be taken in hand. The establishment of such a procedure has often been advocated by American psychiatrists and criminologists. But Hamblin Smith believes we are correct in claiming this as the first occasion upon which such a scheme has been sponsored by a prominent and responsible politician, a candidate for the United States Presidency. The reception of his proposal will be watched with great interest. It will be noted that the decision, as regards the treatment of a convicted offender, is not placed solely in the hands of a body of medical scientists. The proposed Board would consist, in part, of legal members. This should go some way to meet the objection, which is certain to be made, that psychiatrists desire to usurp the functions of courts of law. Assuming that the scheme is adopted, its success will naturally depend upon the composition of the Board. The mention of a jury would appear to imply that the operation of the scheme is limited to more or less serious cases, such as are, in this country, tried at Assizes and Quarter Sessions. But it would only be an extension of degree to apply a similar procedure to cases which are dealt with by minor Courts.

CLINICAL PSYCHIATRY.

Psychiatric Significance of Obsessions.—At one time the obsessional neurosis was regarded as a more or less clear-cut entity which, though varying in severity, more or less retained its general characteristics. It is now known, however, that it may undergo all kinds of transformations and is liable to develop into a true psychosis. A. Gordon[4] is responsible for an interesting study in which he analyses obsessional reactions especially in their relations to the psychoses. He reaches the following conclusions : (1) Obsessive neurosis as a clinical entity may exist throughout the entire life of an individual, continuously or more frequently episodically, without admixture of manifestations of a psychotic disorder. (2) Obsessions may occur symptomatically in the course of chronic paranoia or dementia præcox. In such cases they may be considered of the same order as any other morbid phenomenon characteristic of paranoid or schizophrenic types of individuals, in whose life various morbid manifestations of a psychotic nature may occur episodically. (3) When delusions in paranoia and dementia præcox are fully developed, the former obsessive phenomena usually subside or disappear. (4) Obsessions may occur in the course of many mental affections. (5) A direct transformation of an obsessive into a delusional idea is possible but it is not very frequent. (6) More frequently the obsessions form a point of departure for the development of delusions by a process of argumentative interpretation, which is especially strong in paranoid individuals, and this is particularly marked in cases in which the obsessions are persistent. (7) A paranoid individual, after having elaborated his delusions, may include in the latter his former obsessions, or else develop new delusional ideas with a different content. (8) Transition of obsessions into delusions, infrequent as it is, may be observed both in paranoid states and in affections of a depressive nature, especially when the latter repeat themselves and are persistent. (9) The existence of obsessions in the life of an individual has no direct bearing upon the form of psychosis which may develop later. It only implies the existence in that individual of a psychic dissociation of personality which reaches its maximum during the paroxysm. The newer conception of dissociation of personality, concerning the forces at work in the formation of obsessions which may or may not develop into delusions, is, perhaps, of great value and fruitful in the consideration of the subject. Though the mere existence of obsessions over a prolonged period does not necessarily suggest the later development of a psychosis, it renders the individual potentially psychotic.

L. Redalie[5] describes a case in which obsessions were replaced by psychic hallucinations, and later by true auditory hallucinations. In all three phases the content of the morbid mental activity was similar, but in the first there was extreme anxiety, less in the second, and marked indifference in the third. Reference is made to other similar recorded cases, and the possible causes of the development of hallucinations in obsessional cases are discussed.

Climacteric Psychoses.—E. Jones and S. J. Minogue[6] have made clinical studies of mental disorders of the climacteric in 250 female patients. The mean age of the menopause was determined on reliable information obtained from 108 patients, and was found to be 47 years. The extremes were 55 and 36 years; in the latter case cessation of menstruation occurred suddenly after the death of the patient's husband, and amenorrhœa has continued to the time of her admission at the age of 56. Since the actual menopause is so uncertain, it was considered advisable to include in the analysis all patients who had been admitted between the ages of 40 and 60.

The cases were classified in seven main groups: melancholic, manic, paranoid, alcoholic, confusional, and miscellaneous psychoses, and, finally, the psychoneuroses. The melancholic psychoses predominated, and represent 40 per cent of all admissions. The group of next importance was the confusional insanities, comprising 14 per cent of cases. After discussing the clinical features of each group, the writers point out that it is undoubted that there is an increased incidence of insanity during the involutional period. This is partly explained by the development at this time of the syphilitic psychoses, but these are much less important in women than men. There seems little doubt that the metabolic disturbances consequent on the cessation of ovarian function produce an emotional instability which is manifested by a greater tendency to psychoneurotic reactions. That the disorders of this period are not due to permanent organic changes is shown by the fact that there is a rapid fall in the incidence of insanity after the climacteric, and the rate does not rise again until the degenerative changes of senility begin to appear at the age of 65. A review of the mental disorders of the involution period well-nigh gives a bird's-eye view of the whole of psychiatry, the striking features of which are the predominance of melancholic psychoses, the relative infrequency of mania, and the rarity of schizophrenia. The writers suggest that this predominance of depression is due to the loss of the activating ovarian hormones on cerebral centres. It was found, too, that involutional psychoses are generally precipitated by psychic or physical stresses in patients already predisposed to the attack by heredity, by previous attacks, or by inferiority in the mental make-up.

An examination of the *conjugal conditions* of these patients was illuminating. Particularly in the melancholic and paranoid conditions there is a great preponderance of single women. This fact is open to two interpretations: (1) That the single state itself predisposes women to these psychoses; or (2) That they are single because of their psychopathic disposition—that is, they are of the 'shut-in' type that does not marry. In many of these women there is an embitterment from an old love affair; in some there is a history of seduction. In many families, too, one girl remains at home with the parents or undertakes the responsibility of dependent relatives and does not have the opportunity for courtship. It is at the involutional period that these women lose their parents, and the rupture of the familial life, which has persisted long beyond the usual period, throws the individual on to her own resources at a time when she is ill fitted to establish a position for herself.

A particularly interesting analysis is given of 64 cases of artificial menopause, 38 of which were due to hysterectomy and 26 to double oöphorectomy. A history of artificial menopause has been obtained in 3·8 per cent of patients admitted to Broughton Hall. This proportion seemed high, and led the writers to think that hysterectomy and double oöphorectomy were a definite factor in the causation of mental disorder—an impression, indeed, which many psychiatrists probably share. A review of the case material, however, rather dissipated this view, and it was found that in most cases of hysterectomy it was probable that the natural menopause was the important factor in the development of their symptoms. With regard to the cases of double oöphorectomy, whilst patients who were admitted within two years of operation complained of the classical symptoms of the menopause, it was difficult to correlate the operation as a cause of mental disorder. In many cases other etiological factors were involved which determined the nature of the psychosis, as, for example, in the confusional, alcoholic, and arteriosclerotic groups. In many, too, there was an antecedent history of neurotic symptoms and of various psychological stresses, the most common of which was domestic infelicity. In these cases the operation probably acted as an additional psychological stress, or by precipitating a sudden metabolic disturbance which aggravated the pre-existing psychopathic tendency.

Puerperal Psychoses.—E. A. Strecker and E. G. Ebaugh[7] discuss 50 cases associated with or following childbirth. The diagnoses were: manic-depressive, 18 cases; toxic-exhaustive, 17; dementia præcox, 13; general paralysis, 1; and psychoneurosis, 1. The chief points of interest arising out of these studies were that, although the occurrence of manic-depressive psychosis is not determined by childbirth, its clinical picture may be coloured by it, and there is greater likelihood of hypermanic states, disturbance of the sensorium, and hallucinosis. In dementia præcox there is a greater frequency of manic-depressive features than is usually noted, and, as in manic-depressive psychoses, the sensorium is likely to be clouded. Contrary to the usual belief, dementia præcox following childbirth does not deteriorate with unusual rapidity.

PSYCHOPATHOLOGY.

The Etiology of Alcoholism.—In opening a symposium on this subject, B. Hart[8, 9] defined alcoholism as the continued and excessive ingestion of alcohol, and reviewed the answers that had been offered to the question: Why do people take alcohol to excess, or, indeed, at all? Some had emphasized heredity, others habit, and others again psychological factors. It seemed as if the last were tending to exclude the others unduly. The modern psychologist held that the forces which drove men to take excessive alcohol were, in some measure at least, identical with those which drove them to take it at all. Therefore the cause of alcoholism must be sought for by inquiring into its effects. F. G. Stockert had divided these into two groups: (1) Psychomotor stimulation, coupled with an expansive and euphoric affective tone; and (2) A dulling process, extending to paralysis. The subjective increase was the more important and greater factor. The astonishing efficiency of alcohol as a refuge was apparent not merely in the way it met an immediate need, but in the continuous service it afforded, so that many of the symptoms of chronic alcoholism and of the alcoholic psychoses themselves gave further aid in the escape from reality. The sociability produced was one of the principal aims of taking alcohol. Psycho-analysts held that alcohol tended to destroy sublimations and aid mental regression, that homosexual factors played a prominent part, and that regression might proceed to various depths.

It was debatable how far any particular effect of alcohol was to be regarded as an aim, and how far it was a price paid in the achievement of some other end. The psychological aims did not exhaust the whole problem, and other factors required careful handling. The first of these was the essential craving, which did not arise prior to experience of alcohol, and disappeared after prolonged abstinence. It did not seem susceptible of any satisfactory explanation. The closely similar phenomena of morphinism were certainly attributable to the formation of chemical products which required further doses to counteract their effects. The psychological aims, craving, and habit constituted the 'exciting causes'. It would seem to be easiest to explain the 'predisposing causes' on the assumption that alcoholism, neuroses, and psychoses were alternating methods of achieving an escape from a reality to which adaptation had been found impossible. Since all of them occurred more often in some stocks than others, a constitutional factor had to be admitted. Dipsomania had been held to be a manifestation of epilepsy, of psychasthenia, and of manic-depressive insanity, while others regarded it as a symptom-complex and not a disease *sui generis*. The solution of the problem was not to be found in any single or specific mechanism, but alcohol might serve several ends, and various types of individual, on account of their hereditary constitution or prior history, might be more or less likely to avail themselves of alcohol as a means of securing those ends and hence to engender processes to which habit would ultimately contribute its part.

The Psycho-analysis of the Alcoholic.—E. Glover, dealing with the problem from the psycho-analyst's point of view as a mal-adaptation rather than as a disease, said that all the primary features of alcoholism represented fundamentally an attempt on the part of the individual to extricate himself from an impasse. From the environmental side it was a flight from reality, which coincided on the instinctual side with an increase in phantasy formation. Clinical differences could not be related to the completeness or periodicity of this withdrawal from reality. The investigator was too apt to dismiss the drunkard's phantasy life by calling him 'an inveterate liar', and to obscure its significance by the word 'confabulation'. Hallucinations and delusions indicated an attempt to substitute a new reality for the old, or to project into reality the more painful elements of phantasy life. Withdrawal from reality activated phantasies corresponding to definite layers of psychic development, so that an element of regression was always present, heading towards some infantile end. Aggressive and sexual instincts were manifestly gratified in drunkenness. The Freudian school, while admitting the social, habitual, and economic factors in alcoholic etiology, held that these were exciting causes, with internal, instinctual frustrations as the real underlying cause. Psycho-analytical investigation of the alcoholic always showed a modification of instinct in the form of intense preoccupation with oral images and phantasies. The alcoholic had made a bad start and was always hampered by a tendency to regression, giving rise to inertia in development. Thus the next stage found him handicapped, and in this stage anal eroticism and anal sadism were heightened. He then came to the third or infantile genital stage with the double difficulty that his impulses were archaic and his reaction to disappointments excessively severe. When the incestuous climax to infantile sexuality was shipwrecked on castration anxiety, the tendency to regression was fully established, and the ground prepared for future miscarriages of sexual instinct in adult life. One of the dire necessities that drove a man to alcohol was the need to overcome excessive charges of castration anxiety. The drunkard's loud boastfulness afforded compensation for inner insufficiency or impotence. When the ego was damaged the anxiety broke through in massive charges.

Many of the guilts and anxieties of alcoholics indicated some interference with the function of conscience; the constant use of projection made their consciences seem turned inside out. The alcoholic either had a more severe primitive conscience than normal, or else was unable to cope with the drive of primitive impulse and landed himself into the situations of self-punishment. The former difficulty was seen in the depressed type of secret drinker, and the latter in chronic alcoholics. Alcohol owed most of its attraction to the fact that it was primarily well adapted to overcome the castration anxiety, although in the long run it defeated its own end by bringing about impotence and death (symbolic castration).

The Recent Decrease in Alcoholism.—E. Mapother pointed out that social influences were the most important in promoting festive alcoholism. He quoted figures to show the striking decrease in the consumption of alcohol between 1914 and 1923. If all the drunkards in the country had gone dry it could not account for the amount. Alcoholism was conditioned by social tradition on the one hand and the cost of getting drink on the other. A reduction of alcoholic morbidity to about one-third of its pre-war incidence had occurred. Temperance and intemperance were national characteristics and not innate, as was shown by the fact that 13 per cent of all the psychoses among Gentiles were alcoholic, and among Jews only 2·3 per cent. The psychoses of the solitary drinker were less rare, relatively, among Jews; it was the acute mental disorder due to heavy social drinking that was rare among them. Mapother said he had not been impressed by the existence of any specific craving independent of association of ideas, nor had he seen any benefit from the giving of alcohol in early delirium tremens. It was possible that alcoholic tolerance depended on the presence of some protecting lipoids circulating in the blood. If so, they were more likely to be preventing the entry of alcohol into the cell than producing reverse effects. They were no more likely to produce a craving for alcohol than would a mackintosh for rain. He had not found a history of overt homosexuality in alcoholics, nor that this formed a feature of their delusions and hallucinations.

Types of Drinkers.—Crichton Miller said that in the broadest sense it might be held that alcohol was taken to modify the feeling tone, in the realm either of somatic or of emotional experience. The resulting modifications might be referred to two chief mechanisms: (1) Interruption in continuity of function of the nervous system, ranging from inco-ordination to dual personality; (2) A repressive change whereby the activity of cortical centres was subordinated to thalamic control, acquired inhibition succumbing to instinctive pressure, and conceptual thinking being submerged by perpetual activity. It might be supposed that these changes depended on two mechanisms—the change in intracranial pressure and the hypothetical alteration in synaptic functioning due to altered chemical constitution of the cerebrospinal fluid. The latter would explain the dissociative phenomena. There was no experimental knowledge of the specific effect of alcohol on the relative tension in intracranial and visceral systems. It might be supposed that the vascular tension was differently affected in the cortex and the midbrain. Any effortless oblivion was an alluring retreat from most forms of conflict. A retreat from conceptual to perceptual ideation was often pleasant if not desirable. The introvert found in alcohol a chemical solvent of the inhibitions that dammed up his self-expression; the man with an inferiority sense found himself 100 per cent, and the psychasthenic derived from alcohol a temporary rise in the threshold of consciousness. The demand of two groups for alcoholic euphoria was based on physical states—namely, the hypopietic and the subthyroidic. Probably low blood-pressure entered into a large proportion of all cases, especially amongst women. Presumably the mechanism of satisfaction in subthyroidics was a general vasomotor stimulation. Hyperthyroidics did not tend to be steady drinkers. In the sensorial type, who sought modifications of sensory experience, came those who alternated alcoholism with auto-eroticism. The rebel drank because his father had been a temperance reformer, and for him gold cures and injections of alkaloids were the height of absurdity. There were three chief groups of intermittent drinkers—the epileptic, the dual personality, and the manic-depressive. The last were resistant to all treatments. Drinking might be a feature of either phase, but never of both. No simple formula and no single etiology would cover the pathogenesis of alcoholism.

Psychiatry and the Conditioned Reflex.—A. G. Ivanov-Smolensky[10] makes an attempt to apply the teaching of conditioned reflexes to the problem of neurotic manifestations. Neurotic behaviour may be described as the expression of a disturbance of equilibrium between cortical stimulative and inhibitive processes; either cerebral stimulation or inhibition predominates. The 'psychic trauma' generally supposed to be the cause of the development of neuroses, from a physiological standpoint, is a difficult task for the balancing of stimulative and inhibitive cortical processes (differentiation or integration). The cerebral hemispheres, being stimulated to activity by the lower parts of the nervous system (feeding, sexual, defensive, and other unconditioned centres), at the same time meet intensive hindrances in biosocial surroundings; thus in the cortex a conflict of the stimulative and the inhibitive processes takes place, which produces an abrupt disturbance of intracerebral balance and a widespread irradiation of stimulation or inhibition (stimulative or inhibitive neurosis). The 'dislodged complex' corresponds to the origination in the cortex of an inhibition the result of an unsuccessful bio-adaptation. The treatment of a neurosis must tend not only to remove cortical 'inhibition spots' (dislodged complexes), but also to train the reflexogenous and balancing function of the cortex. That such a line of thought will carry us very far would appear to be doubtful. Where psychoses of any gravity are concerned, it is most improbable that the manifestations observed could be attributed to the mal-conditioning of normal tendencies. Such conditions are probably not attributable to functional distortions, but rather to endogenous disturbances of an organic nature. At the same time, to think in terms of conditioned reflexes is to give an objective orientation to psychopathology. The 'psychic trauma' theory of the neuroses is open to question, though no doubt psychogenetic factors enter into the causation of every mental illness.

J. H. Cassity[11] thinks that psychosexual impotence may exert more influence upon psychotic developments than is generally believed. He quotes a number of cases which support the thesis that unfavourable environmental factors, whether they be micro-organisms, parental ill-treatment, sexual traumas, nursing excesses, or what not, often seriously interfere with psychosexual development. The individual is then obliged to change his attitude towards life in order to reconcile his actual or imagined sexual inadequacies with sociological and biological requirements. Further, it is in this shift and transformation that he assumes a different perspective from the average individual and hence becomes a neurotic or psychotic. The writer regards this as affording an explanation of many of the reactions of paranoia, melancholia, and general paralysis, and considers that there may often be actual sexual weakness of a somatic type.

PSYCHOTHERAPY.

Just as organic factors enter into the causation of mental illnesses, so in organic diseases it is impossible to exclude altogether the influence of psychogenetic factors. The manner in which people react to bodily illnesses varies considerably, and associated with organic disabilities there is often a considerable functional 'aura'. Staudacher[12] discusses the uses of psychotherapeutic treatment in organic diseases, and shows that in these there may be a considerable emotional factor. He suggests that the field of psychotherapy may be usefully widened, instead of letting quacks deal with cases thought unsuitable for—but really capable of benefit by—such treatment. The author, whose method is suggestion under hypnosis, describes fully two cases which he treated when they thrust themselves upon him after he had refused them as being wholly organic and not suitable, but which proved to have a large functional element and to derive great benefit from psychotherapy. One of these cases may be briefly described. Following on acute trench nephritis, the patient had for nine years exhibited the symptoms of chronic nephritis. He had albuminuria, had recently had uræmic convulsions and albuminuric retinitis. He complained of severe headaches, general weakness, and impaired vision. The fear of blindness played a large rôle in a general anxiety state, and he became generally nervous, depressed, and sleepless. The convulsions were of a mixed type, with a considerable hysterical element in some of them. The treatment was undertaken unwillingly by Staudacher, at the request of the patient, his doctor, and his relatives. The results were surprisingly beneficial: from being hardly able to walk he regained a fair degree of activity; sleep, headaches, and vision improved, and with the general improvement and hopeful mental attitude even the albuminuria was reduced considerably. In the after-history of this case there were several relapses, aborted by prompt suggestion under hypnosis. The author suggests that the mechanism of such improvements is probably the influence of the emotions acting through the vegetative nervous system, bringing about changes of vascularity which affect the course of a chronic organic condition. A hopeful outlook and increased desire for health thus promote natural healing tendencies. In cases where there is a considerable emotional factor and neurotic elements superadded he urges that doctors should use psychotherapy in their treatment.

REFERENCES.—[1]*Brit. Med. Jour.* 1928, i, 9; [2]*Ibid.* 1927, i, 188; [3]*Jour. of Mental Sci.* 1928, April, 281; [4]*Amer. Jour. Psychiat.* 1926, v, 647; [5]*Ann. of Med. Psych.* 1926, Oct.; [6]*Med. Jour. Australia*, 1927, Aug. 27, 282; [7]*Arch. Neurol. and Psychiat.* 1926, xv, 239; [8]*Proc. Roy. Soc. Med.* (Psychiat. Sect.) 1928, xxi, 1341; [9]*Lancet*, 1928, i, 704; [10]*Amer. Jour. Psychiat.* 1927, vii, 483; [11]*Jour. Nervous and Mental Dis.* 1927, lxvi, 105; [12]*Münch. med. Woch.*, 1926, 2020 (abstr. *Jour. Neurol. and Psychopathol.* 1928, ix, 88).

MESENTERIC LYMPHADENITIS.

John Fraser, Ch.M., F.R.C.S.Ed.

G. D. F. MacFadden,[1] after discussing the more stereotyped aspects of the disease, deals with the question of *diagnosis*. The impressive statement is made in illustration of the difficulty in diagnosis that "in 6000 or 7000 cases admitted to various hospitals only forty-five were correctly diagnosed!" The author does not tell us the source from which this information is derived; it would have been interesting had he done so, as it is doubtful if there is any other disease in which the percentage of possible error in diagnosis reaches 99·3 per cent.

In discussing the clinical history in relation to diagnosis, the author suggests the division of the clinical entity into three groups, the pathology being related to the symptomatology. *Group I* is usually met with in children. The glands are enlarged, discrete, inflamed, and succulent, the more evident clinical signs being indefinite stomach trouble, attacks of acidosis, and abdominal pain. The last feature is the most constant evidence of the clinical picture. It is often severe, it may last from five minutes to several hours, it may be as sudden in its onset as a perforation or as chronic as an ulcer, it usually begins in the neighbourhood of the umbilicus, and it passes to one or other side of the lower abdomen, but usually to the right iliac fossa. In the physical examination of this group two findings are considered important: that the point of maximum local tenderness is not at McBurney's point but more medial, with an area of extension upwards beneath the rectus muscle; and that on rectal examination the finger, swept round the lateral wall of the pelvis, detects an enlarged sacral gland. In *Group II* the symptoms and signs are often remarkably acute. The glands are evident as a large tender mass, usually caseating, there is often considerable rise of temperature, and there may be a leucocytosis of 14,000 to 17,000. Cases of this description behave like an appendix abscess, and in certain instances the eruption of the pus into the abdominal cavity may bring about an abdominal catastrophe. *Group III* represents the chronic manifestations of the disease. The glands are small and often calcareous, pain is universally present, it is chronic in type and uncertain in its manifestations, and according to its distribution it may simulate duodenal or gastric ulcer, chronic appendicitis, or renal colic. Its similitude to the last-mentioned condition may be remarkably close, even to the evidence of hæmaturia. It is often a point of importance in the differential diagnosis that the pain is induced by exercise. The paper deals with a difficult subject in an informative way. (*See also below.*)

REFERENCE.—[1]*Brit. Med. Jour.* 1927, ii, 1174.

MESENTERY, AFFECTIONS OF.

A. Rendle Short, M.D., F.R.C.S.

Solid Tumours of the Mesentery.—These are not common as primary affections. According to W. E. Darnell,[1] who records a case, there are about 41 examples of *fibroma* of the mesentery in the literature. It was necessary to resect 30 in. of ileum in his case to get the tumour away, and the patient died of shock. *Lymphosarcoma* is probably more frequent, and is usually met with in males. A case in a child is reported by L. L. Bigelow, E. Scott, and S. W. Obenour,[2] which was operated on for distention of the abdomen and vomiting. A mass of sarcoma in the mesentery, with numerous metastases, was found. The child died after the exploration. The authors state that no operation is likely to do any good.

[In a similar case under the reviewer's care, not reported, there were numerous masses of sarcoma in the mesentery and on the bowel wall, too extensive for removal. Deep X-ray therapy was given, and the swellings cleared up. The patient returned to his occupation, and lived for years. Two years afterwards the lumps returned, but further X-ray treatment was again successful.—A. R. S.]

Mesenteric Lymphadenitis.—Two papers on this subject appear. Jennings Marshall[3] points out that the glands are often non-tuberculous. It is most frequently seen in girls between 5 and 15. There may be acute attacks of pain and fever, often 102° or 103°, with some tenderness in the right lower abdomen, so presenting a superficial resemblance to appendicitis. Rigidity is absent, and the glands are usually palpable, either with or without an anæsthetic. There are chronic cases, with brief attacks of pain. The glands most frequently involved are those in the ileocolic angle. As a rule there is no obvious disease of the appendix or intestine. It is best in the majority of cases to remove the appendix, so as to confirm the diagnosis. It is not necessary to excise all the glands.

L. P. Bell,[4] of California, writes on mesenteric glands, but seems to regard them all, or nearly all, as tuberculous. The clinical picture is as already described. He mentions that the pain may only last a few minutes, and that the blood-count will probably show about 12,000 to 15,000 leucocytes. A skiagram may show calcified glands. The treatment advised is **Exploration** but not removal, unless the gland is caseous, followed by **X Rays** or **Ultra-violet Light.**

REFERENCES.—[1]*Ann. of Surg.* 1928, June, 870; [2]*Ibid.* 879; [3]*Brit. Med. Jour.* 1928, i, 631; [4]*Surg. Gynecol. and Obst.* 1927, Oct., 465.

MIGRAINE.

Sir James Purves-Stewart, K.C.M.G., C.B., F.R.C.P.

Notwithstanding the abundant literature upon migraine and the frequency with which the syndrome occurs, it is remarkable how little we actually know of its essential pathology. The apparent indifference of the pathologist may be accounted for in various ways. Firstly, the disease, although disabling at the time, does not imperil life or even interfere seriously with the general health. Then, the attacks tend to subside in later life, whilst the methods of treatment are so varied and so empirical that in these days of specific diagnosis and specific treatment mere empiric remedies rouse little enthusiasm.

Whatever be the true explanation or explanations of the actual migraine attacks, the best established and most constant factor is that of heredity. This, of course, like the doctrine of predestination to the Calvinist, is fixed and inevitable. There are also the familiar exciting causes, such as errors of refraction, nasal troubles of various sorts, nervous exhaustion, and so on. It is evident that no one cause can be accepted as the sole etiological factor.

When we come to the problem of treatment, there is no lack of empirical remedies, varying in their character according to the observer's views as to the mechanism whereby the migrainous paroxysm is brought about. For example, C. L. Hartsock,[1] of Cleveland, maintains that many cases of migraine are associated with duodenal stasis. On this assumption he points out the frequency with which migrainous patients continue to vomit during the attack until dark-green bile is brought up, after which the attack promptly subsides. This phenomenon is probably the reason why the attacks are popularly known as bilious headaches. On the theory that the relief which follows the vomiting of bile, which must have come from the duodenum, indicates duodenal stasis, he has treated a series of cases by artificial drainage of the duodenum. Not content with the exhibition of mercury followed by a saline draught, he attacks the duodenal stasis by **Duodenal Lavage** and even by the operation of **Duodeno-jejunostomy.** He quotes a series of 17 cases of migraine thus surgically treated, and claims that in 13 of them, in which migrainous headaches were complained of, the headaches were relieved in all except 2 cases in which the operation was inefficient so that a pocket still remained in the duodenum, permitting of the persistence of the duodenal stasis. He also insists on the importance of a diet from which carbohydrates are excluded, whilst regular exercise and careful attention to the relief of constipation are insisted on. In addition, even where the bowels are regular, he prescribes a routine flushing of the duodenum once a month by means of calomel and a saline mixture.

J. S. Diamond,[2] of New York, attacks the problem from a different angle, believing that not the duodenum but the liver itself is the organ primarily at fault. Accordingly he tested a series of 35 cases of migraine by *liver-function tests*, including the van den Bergh estimation of bilirubin in the blood serum and the urobilinogen test in the urine. Complete examinations were performed in every instance. The gall-bladder was studied by X rays after being rendered opaque by tetraiodophenolphthalein; the gastric contents were examined by fractional test-meals; errors of refraction in the eyes and other causes of symptomatic migraine were also excluded from the series. In the 35 cases of migraine, yielding nothing positive by the afore-mentioned methods, 32 showed evidence of disturbed liver function, as estimated by the van den Bergh reaction. These cases showed a retention of bilirubin in the blood, varying from 1 to 5 units (the normal being from 0·4 to 0·8 unit). In other words, all of these cases presented the so-called 'latent icteric' stage, i.e., a condition in which the concentration of bilirubin in the blood serum does not exceed the normal kidney threshold for bilirubin, which is from 4 to 5 units. Above this level, bile escapes into the urine. The high van den Bergh readings were a constant finding. They were present not only during the attacks but also during the interval between them, practically with the same intensity, thus indicating a permanent liver change. In the urine the urobilinogen was variable. In mild cases the amount varied from normal to slightly above normal, the figures being highest in the severe cases. Headache of hemicranial type was present in all 35 cases; 12 cases were of pure cephalic type without digestive upset; in 15 cases the headache was associated with nausea and vomiting, constituting the so-called bilious attacks; in 8 cases the gastric and abdominal symptoms predominated, with definite abdominal pain simulating biliary colic or gastric crises so urgently as to call for relief by morphine. So manifest were the gall-bladder symptoms that 3 of the patients were subjected to laparotomy, and in 2 instances the gall-bladder itself was removed in spite of negative findings. The periodic attacks of pain and vomiting, however, continued unabated after the operation.

The van den Bergh and urobilinogen reactions were lowest in the group with simple hemicrania, higher in those with bilious attacks, and highest of all in the third group, classed as abdominal migraine. Constipation of the spastic type was noted in every case. This was recognized by the presence of small narrow scybala in the stools, and of a tight, constricted, ribbon-like colon as seen in the radiographs. Many patients found that certain articles of diet invariably precipitated an attack, e.g., tinned or pickled meats, or fish, goose, duck, or turkey. If prompt purgation was secured after such indiscretions, the subsequent migraine attack was shortened. It is interesting that Diamond found the blood-pressure habitually low, ranging from 90 to 110 systolic and 60 to 80 diastolic. He considers that toxic putrefactive substances reach the general circulation through the failure of the liver to synthetize and detoxicate them. A series of symptoms then arise which are the result of vascular symptoms in the cerebrum or other viscera, which may be regarded as anaphylactic in character. Substances such as histamine and tyramine, putrefactive products derived respectively from the amino-acids histidin and tyrosin, are extremely toxic and are known to induce vascular changes, the former causing vasodilatation, the latter vasoconstriction. Acting on this theory, Diamond aims at treatment by changing the intestinal flora to *B. acidophilus* and the avoidance of intestinal putrefaction. All animal proteins are therefore withdrawn from the diet, and the patient is placed on a strict **Lacto-vegetarian Régime. Sour** or **Acidophilus Milk** is also given, and special attention is paid to the correction of the spastic constipation.

Döllken,[3] of Leipsic, has actually induced attacks of migraine by the subcutaneous injection of 0·5 to 1·5 mgrm. of histamine, the attack occurring within half an hour and lasting from thirty to forty-five minutes. He found that histamine renders the capillaries abnormally permeable. During a migrainous headache the veins and arteries on the affected side of the head are abnormally tender on pressure. Döllken's theory of the migraine attack ascribes it, not to pure vasodilatation, but to a different reaction in the capillaries, veins, and arteries, the arteries and veins being contracted and the capillaries dilated, so as to cause excessive exudation of cerebrospinal fluid with consequent rise of intracranial pressure. Accordingly he is a strong partisan of treatment by vasodilators, especially by **Nitrites,** so administered as to induce a permanent stability in the tonus of the arteries and veins. Besides nitroglycerin, we have the organic nitrites, such as nitroglycol, erythroltetranitrate, mannit-hexanitrate, etc. To secure the best results, Döllken maintains that these must be administered not merely during the attacks but systematically for many months in the intervals between paroxysms. Small doses, one-tenth of the average dose, given regularly, have a cumulative effect. He prescribes a mixture of various nitrites, called moloid tablets. Half a tablet, corresponding to a dose of 0·5 mgrm. of nitroglycerin, is chewed after breakfast, and another half-tablet after the mid-day meal. These must be taken with 'pedantic regularity'. Rarely is it necessary to add a third dose in the evening. In some patients who are specially sensitive to nitrites it may be wise for the first few days to restrict the dose to a quarter of a tablet, i.e., 0·25 mgrm. of nitroglycerin. He claims that under this treatment, in 80 per cent of his 4000 cases the migraine attacks cease after five days and remain absent so long as the regular administration of nitroglycerin is continued. Inveterate cases with severe and frequent attacks may require two or three weeks before noticeable results are achieved.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* 1927, Oct. 29, 1489; [2]*Amer. Jour. Med. Sci.* 1927, Nov., 695; [3]*Munch. med. Woch.* 1928. Feb. 17, 291.

MOLAR AND SALIVARY GLANDS, MIXED TUMOURS OF.

Sir W. I. de C. Wheeler, F.R.C.S.I.

Four or five glands lie in relation to the facial vein on the surface of the buccinator muscle near the point of perforation by Stenson's duct (*Fig.* 62). Mixed tumours of the cheek arise in connection with these molar glands (*Fig.* 63), which are mainly mucous in character. L. R. Fifield[1] commented on these cases and the absence of literature in connection with this subject.

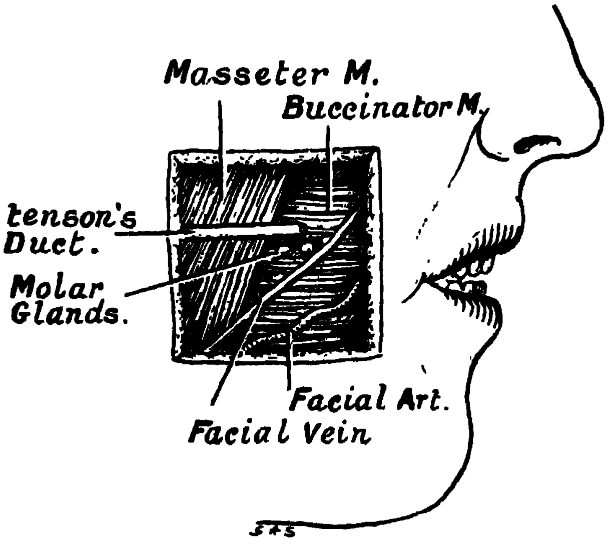


Fig. 62.—The anatomy of the molar glands. (*Modified from a specimen in the London Hospital Museum, by courtesy of Professor William Wright; and reproduced by kind permission of the 'Lancet'.*)

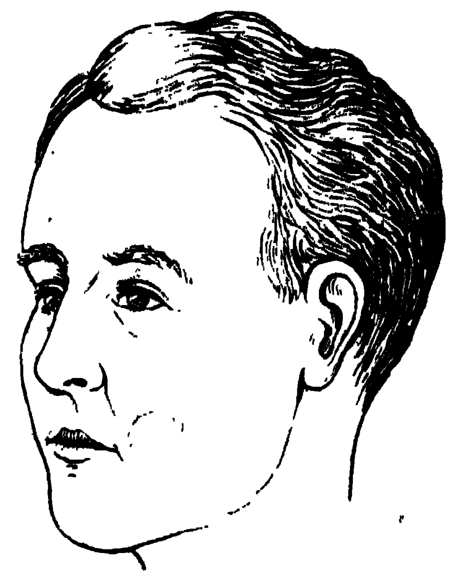


Fig. 63.—The characteristic swelling formed by a mixed tumour of a molar gland.
(*By kind permission of the 'Lancet'.*)

R. M. Fry,[2] discussing the mixed tumours of the salivary glands, arrives at the following conclusions: (1) The so-called mixed tumours of the salivary glands are not in reality mixed, but are entirely epithelial in origin. They are in most cases derived from the ducts of the gland, but occasionally arise from the secreting cells. (2) The mucinous material which is such a prominent feature of most of these tumours is a true secretion of mucin by the tumour-cells, and this is only an exaggeration of a normal function of the gland-cells. (3) The tumours do not contain cartilage. In the substance which has been described as cartilage, the matrix is formed by a change in the mucin of the tumour, whereby it loses its fibrillar appearance and its power of staining deeply with mucicarmine; the cells are epithelial cells. (4) Some of the tumours show varying degrees of malignancy; there is no definite dividing line between the innocent and malignant, and some of the more malignant may show many of the features typical of the innocent type of tumour.

References.—[1]*Lancet*, 1927, ii, 652; [2]*Brit. Jour. Surg.* 1927, Oct., 291.

MUMPS.

J. D. Rolleston, M.D.

Etiology.—R. Bénard[1] performed lumbar puncture on 18 patients suffering from mumps. In 18 no micro-organisms whatever were found with the ultra-microscope, although examinations were made in all stages of the disease, but in two a spirochæte was found corresponding to the description of the organism regarded by Kermorgant as the cause of mumps (*see* Medical Annual, 1926, p. 329). These two cases, in which there was no evidence of meningitis at the time, developed signs of this complication three or four days later, when in spite of a careful search no spirochætes could be found in the cerebrospinal fluid. Bénard concludes that by performing systematic and early lumbar puncture in mumps the spirochæte can be found in all cases in the incubation stage of mumps meningitis. [In the absence of any therapeutic object this is quite an unjustifiable procedure.—J. D. R.]

C. Zoeller[2] records three cases of submaxillary mumps in which he found numerous spirochætes in the centrifugalized clot obtained from lavage of the mouth. Cultures were made on diluted serum under anaerobic conditions, and after six weeks' incubation a spirochæte was found corresponding to that described by Kermorgant.

Symptoms and Complications.—In view of the habitual mildness of the disease it is noteworthy that a number of *severe and even fatal cases* have been recorded during the past year. Three fatal cases are recorded by Micheleau,[3] Delcourt,[4] and Sabrazès, Broustet, and Beaudiment.[5] Micheleau's patient was a previously healthy woman, age 34, who in the seventh month of pregnancy developed mumps complicated by nephritis and followed by a fatal attack of eclampsia. Delcourt's patient was a girl, age 17, in whom gangrene of the parotid developed after incision and was followed by myocarditis. The case reported by Sabrazès and his collaborators was that of a man, age 19, who died on the seventh day of disease with symptoms of acute nephritis, pulmonary congestion, epigastric pain, and vomiting. The necropsy showed a massive coagulation necrosis of the pancreas, an intense degree of acute nephritis, congestion and œdema of the lungs, and slight meningeal lymphocytosis.

J. K. Friedjung[6] reports a case in a youth, age 16, in whom mumps was accompanied by high fever of nine days' duration, insomnia, and anorexia. Not only were all the salivary glands affected, but both testes and the pancreas were also involved. Recovery took place, but convalescence was slow. Commenting on Friedjung's case, H. E. Inhelder,[7] who reports an instance of mumps oöphoritis in a girl of 20 which was at first mistaken for appendicitis, expresses the opinion that the orchitis and oöphoritis of mumps play a more important part in the causation of sterility than is supposed. On the other hand, R. Bénard[8] considers that cases of bilateral orchitis with atrophy, impotence, and feminism as sequelæ of mumps are mythical, both on statistical and anatomico-clinical grounds.

J. Huber[9] reports a case of *pluriglandular syndrome* following mumps. The patient was a man of 26 who, after a severe attack of mumps complicated by unilateral orchitis followed by atrophy of the left testis, developed sexual frigidity, hypertrichosis, and upper dorsal kyphosis, indicating over-action of the suprarenals and hypophysis respectively; general weakness; and diffuse pain, most marked in the lumbar region and sacrum, suggesting involvement of the sympathetic. No benefit was derived from opotherapy.

P. Couronne,[10] who has collected nine cases of *diabetes following mumps*, four of which were fatal, in patients of ages from 6 to 42, remarks that mumps is the only infectious disease besides syphilis which gives rise to diabetes. Moreover an attack of mumps in a diabetic subject may cause grave symptoms of acidosis. It is necessary, therefore, to make a careful examination of the urine during and after an attack of mumps, especially if there are signs of involvement of the pancreas, so as to institute an appropriate diet and insulin treatment at the very onset of an attack of diabetes.

O. Voss,[11] who records nine cases of *deafness and disturbance of equilibrium* following mumps in patients from 6 to 32 years of age, states that these sequelæ may occur in children after the age of 11 years, but are commonest in adults. Unlike other writers who attribute the symptoms to a metastatic labyrinthitis, or neuritis, Voss regards these symptoms as due to serofibrinous meningitis which not infrequently occurs in mumps.

REFERENCES. [1]*Bull. et Mém. Soc. méd. Hôp. de Paris*, 1927, 918; [2]*Ibid.* 970; [3]*Gaz. hebd. des Sci. méd. de Bordeaux*, 1927, 443; [4]*Brux.-méd.* 1927, viii, 89; [5]*Comptes rend. Soc. de Biol.* 1927, xcvii, 860; [6]*Munch. med. Woch.* 1927, 1959; [7]*Ibid.* 1928, 264; [8]*Médecine*, 1927, 184; [9]*Bull. et Mém. Soc. méd. Hôp. de Paris*, 1928, 368; [10]*Thèse de Paris*, 1927, No. 313; [11]*Deut. med. Woch.* 1927, 2074.

MYXŒDEMA. (*See* THYROID.)

NÆVI. (*See also* VASCULAR SURGERY.) *A. M. H. Gray, M.D., F.R.C.P., F.R.C.S.*

TREATMENT.—J. V. Klauder[1] discusses the treatment of nævi, under which heading he includes any congenital anomaly in the skin, present at birth or appearing subsequently.

Nævus Flammeus (Port-wine Mark).—This is the most difficult type of nævus to deal with. He states that this is the only form in which the **Ultra-violet Ray** is of any value, and recommends treatment with the water-cooled mercury quartz lamp with compression. Unfortunately not all cases respond successfully to this treatment. Treatment with **CO_2 Snow** may be of value if the lesion is small, but scarring always results. If the lesion is large, the scar is likely to be uneven and the skin unevenly coloured. **Electrodesiccation** may also be used, but the results are not much better than with CO_2 snow. X rays and radium are not recommended owing to the serious risk to the skin.

Nævus Vasculosus (Strawberry Mark).—The beta radiations of **Radium** are recommended as the method of choice; first-degree reactions are to be avoided, and treatment is not to be too frequent. A simpler, quicker, and more economical treatment is destruction by **Electrodesiccation**, which yields good cosmetic results. [The author does not refer to **CO_2 Snow** treatment, which is usually the method of choice for smaller lesions in this country.—A. M. H. G.]

Angioma Cavernosum.—**Radium** is also recommended for this type of nævus—beta rays for the more superficial lesions and gamma rays for deeper lesions. **Surgical Measures** are required in certain cases, whilst in others **Electrocoagulation** is indicated.

Nævus Araneus (Spider Nævus).—This, though not a congenital anomaly and therefore not strictly a nævus, is included by the author, who recommends destruction of the central red spot by **Electrolysis** or **Electrodesiccation.**

Nævus Pigmentosus.—This group includes pigmentary nævi of various types, from the deep black, flat or raised, potentially malignant new growths, to the simple brown pigmented moles whether with or without hairy growth. Owing to the potential malignant character of these moles the author recommends total destruction of the lesions by **Electrodesiccation** or in some cases **Excision with the Endotherm Knife.** This latter is preferable to ordinary surgical excision. Treatment by X rays, radium, or caustics is considered dangerous. In cases where the lesions are actively growing, X-ray treatment of the glands draining the area has also been employed.

Nævus Pilosus.—These are circumscribed tufts of hair unassociated with pigment. In these cases **Electrolysis** is the method of choice.

Nævus Verrucosus (Warty Nævi).—These frequently form large warty masses and are often very disfiguring. The author recommends **Electrodesiccation** as a method of choice, any subsequent irregular scarring being flattened down by means of X rays.

Nævus Lipomatodes (Nævolipoma).—This is a mixed tumour, in certain types of which the author recommends **Diathermy.**

Lymphangioma Circumscriptum (Lymphatic Nævus).—The lesion is quickly and effectively destroyed by **Electrodesiccation,** which is regarded as safer than X rays or radium.

The article indicates the author's preference for the use of **Diathermy** in the treatment of congenital anomalies of the skin, and is illustrated with a number of photographs showing the good cosmetic results obtained.

REFERENCE.—[1]*Jour. Amer. Med. Assoc.* 1928, i, 1763.

NASAL POLYPI.

A. J. M. Wright, M.B., F.R.C.S.

Although much remains to be discovered as to the etiology, pathology, and treatment of nasal polypi, it would seem to be worth while to give a general summary of our knowledge up to date. Under the term 'nasal polypi' the following varieties are recognized: (1) *Mucous polypi*; (2) *Choanal polypi*; (3) *Bleeding polypi.* Of these, mucous and choanal polypi have many features in common and are possibly only varieties of the same condition. Bleeding polypi, on the other hand, bear no relation to the other two.

Mucous Polypi.—These consist of an œdematous hypertrophy of the mucous membrane, caused by an irritant. This irritant is usually a chronic inflammation, but polypi are occasionally met with in association with a foreign body or malignant new growth. It is possible that in these cases also a secondary inflammation is responsible. Mucous polypi are usually multiple and bilateral. They arise from the accessory sinuses or the parts of the nasal passages in immediate relation to them. They are never found springing from the septum, floor of the nose, or the inferior turbinals. Although inflammation in any of the accessory sinuses may give rise to polypi, they are most frequently found in association with infection of the ethmoidal cells. Thus, their site of origin will most commonly be found to be the middle turbinal or the ethmoidal labyrinth immediately to its outer side. It is probable, however, that the maxillary antrum is more often a source of this condition than was formerly thought. The type of inflammation producing polypi is most frequently suppurative, but may be non-suppurative. Polypi are recognized clinically by the presence of nasal obstruction—the most pronounced and frequently the only symptom—and by the observation of pale semi-translucent and pedunculated masses within the nasal passages. These are soft when touched with a probe, and owing to their pedunculation can usually be moved. When a polypus comes far forwards and is thus exposed to the irritation of dust and to drying, the epithelium covering it tends to become thickened and reddened.

In untreated cases the whole of the nasal passages may become tightly packed, and not infrequently the external nose is expanded. The amount of obstruction produced varies with climatic conditions, the polypi shrinking or expanding with the varying degrees of moisture in the atmosphere. Mucous polypi are very seldom found in children, owing to the fact that the antrum is the only accessory sinus present in the child (*see below*).

TREATMENT.—This may be either: (1) Palliative; or (2) Radical.

1. *Palliative.*—The removal of polypi under a local anæsthetic with the snare or forceps has been done for many years and needs no description. The results produced by this method of treatment vary. In the very great majority of cases, repeated removals at varying intervals are necessary to maintain an airway. The poor results obtained by simple removal have led to the elaboration of other methods which aim at permanent cure. As has been said, polypi are always the result of infection in the accessory sinuses, and radical treatment aims at the opening up and clearing out of the sinuses involved. While infected ethmoidal cells are most frequently responsible, the antrum is also not infrequently involved, as are, to a less degree, the other sinuses.

2. *Radical.*—For a successful radical operation, it is first of all necessary to decide which are the responsible sinuses. The ethmoid is almost invariably involved, and the usual problem, therefore, is to decide what others are also implicated. As far as the antrum is concerned, a skiagram is of considerable assistance, the presence of polypi within the antrum producing a diffuse opacity. Proof puncture is misleading, as the mere return of clear fluid from the antrum does not exclude the presence of polypi. Difficulty in syringing through, and the intermittent return of fluid, are always suggestive of their presence. The only certain method of diagnosis is to open the antrum through the canine fossa so that the cavity may be inspected. As far as the other sinuses are concerned, a preliminary stage to the clearing out of any of them is the opening up of the ethmoid. Thus, as far as the radical operative treatment is concerned, it will be seen that the first and essential stage is as thorough a clearing out of the ethmoidal cells as is possible, followed, if necessary, by the opening of the antrum through the canine fossa, of the sphenoidal sinuses through the nose, or of the frontal sinuses through an external incision. The details of the various methods of carrying out these operations vary with the operator. It may be said that the results of these radical operations are vastly superior to those of simple removal, and, while some risk must be involved, the degree is not such as should seriously militate against operation.

R. H. Skillern[1] advises post-operative treatment consisting in the application of cotton tampons saturated with a 10 per cent solution of **Silvol**, or some other non-irritating silver preparation, in equal parts of water and glycerin. These tampons should remain in position for four or five hours, and be applied on alternate days at first, and less frequently later.

Some cases of nasal polypi are met with in which, in spite of the most radical operations, recurrences still arise, and in which operation seems to introduce infection and thus to hasten recurrence. In these cases, only the minimum necessary to maintain an airway should be done. An attempt to help these patients has recently been made with **Radium** applications, apparently with some degree of success. S. McCullagh[2] first performs a radical operation and then applies 50 mgrm. of radium for two hours, repeating the application on four or five occasions at intervals of two weeks. G. Sluder[3] has employed 12½ mgrm. in a gold tube on either side among the polypi, allowing it to remain for three hours. This application is repeated at monthly intervals on three or four occasions. J. C. Scal[4] also reports promising results in sixty-five cases.

Recurring Nasal Polypi in Children.—Rare cases occur in which recurrent mucous polypi with suppuration are found in children. These are due to a congenital syphilitic infection which involves the bony framework of the nose and usually leads to considerable deformity.

Choanal Polypus.—The choanal, antral, or post-nasal polyp bears some points of resemblance to the mucous polyp. Its characteristics are that it is single, unilateral, and cystic. It usually arises from the antrum, to which it is attached by a long thin pedicle, and tends to pass backwards into the nasopharynx, not infrequently almost filling it and projecting below the soft palate. It can be distinguished from nasopharyngeal fibroma by its softer consistency and absence of attachment in the nasopharynx. Owing to the usual formation of cysts within the polyp and to the occasional rupture of these, a history of sudden relief to the nasal obstruction, with a discharge of watery fluid from the nose, is not uncommonly met with. This variety of polyp is sometimes found in children, probably because, in them, the antrum is the only accessory sinus which is fully developed. Owing to the tendency to cyst formation, these cases may present the unusual sign that on transillumination the antrum is more transparent on the involved side than on the other. In contradistinction to this, it will be found, in the skiagram, that the involved antrum is relatively dark.

TREATMENT.—It is worth while to try simple removal of a choanal polyp at least on one occasion, as, although recurrence generally takes place, this is not invariable. Removal with the snare or forceps will usually necessitate a general anæsthetic, and a finger inserted into the nasopharynx may be of assistance. When recurrence takes place, the antrum should be opened through the canine fossa and the site of origin of the polypus removed.

Bleeding Polypus.—This condition is a discrete angioma and usually arises from Kiesselbach's area of the nasal septum It may, however, occasionally occur on one of the turbinals or on the floor of the nose. Some varicosity of the vessels in this area is very commonly met with, and it is interesting that a definite vascular tumour formation should occasionally occur in the same area. A bleeding polypus is recognized by giving rise to recurrent nose-bleeding and unilateral nasal obstruction. On examination, it is seen as a bright-red mulberry-shaped swelling, either sessile or to some extent pedunculated. Not uncommonly some degree of ulceration of the tumour takes place, increasing the tendency to bleeding. Removal is carried out with the **Snare, Cautery,** or **Diathermy,** with subsequent cauterization of the base. In some cases it is necessary to elevate the portion of mucous membrane to which it is attached, and to remove this with the growth.

REFERENCES. [1]*Brit. Med. Jour.* 1928, ii, 562 ; [2]*Arch. Otolaryngol.* 1926, 215 ; [3]*Laryngoscope*, 1924, Feb., 124 ; [4]*Ibid.* 1927, Oct., 735.

NASAL SINUSES, DISEASES OF.

A. J. M. Wright, M.B., F.R.C.S.

Frontal Lobe Abscess Secondary to Frontal Sinusitis.—An abscess of the frontal lobe of the brain is not very uncommon as a complication of frontal sinusitis. Lesions of this relatively 'silent' area of the brain are notoriously difficult to diagnose. The summarized observations of C. J. Imperatori[1] on five cases are, therefore, of some importance. All the patients were under 28 years of age, and in all of them the disease had shown itself externally by the presence of œdema of the eyelids, chemosis, or even an orbital abscess. In four the abscess was on the same side as the diseased sinus, and infection had taken place by direct extension through the posterior wall. In the fifth case the abscess was metastatic and on the opposite side to the diseased sinus. The *Staphylococcus aureus* was found in all, and in each case there was a leucocytosis of over 15,000. The prominent symptoms were grouped as follows :

(1) Headache, especially at night, and located on the side on which the abscess was found; (2) Occasional vomiting; (3) Some changes in the optic discs, an optic neuritis when the abscess was localized; (4) High temperature towards morning; (5) Pulse-rate usually in relation to the temperature, and in no case a low rate; (6) Insomnia, some mental dullness, and poor memory, dependent on the progress of the brain destruction; (7) Convulsions (three of the patients with right-sided abscess had convulsions); (8) Optical aphasia; (9) Diminished abdominal reflexes contralateral to the abscess; (10) Usually exaggerated knee-jerks and ankle-clonus. Three cases recovered following operation.

Nasal Sinusitis and Mental Disorder.—This association was referred to in the article on MENTAL DISEASES in the MEDICAL ANNUAL, 1928, p. 294. During the past year the attention of the rhinologist has been focused on the question by a discussion at the Laryngological Section of the Royal Society of Medicine. The subject is being investigated at the Birmingham Mental Hospital, and T. C. Graves[2] related five cases of insanity in all of which the diagnosis of chronic nasal sinusitis had been established at operation, and in four of these cure of the mental disease followed the operation. He stated that 50 per cent of the cases admitted to the mental hospitals showed infective foci in the nose or throat. In some of these, a common causal factor, such as influenza, had probably accounted for the sinusitis and the mental derangement. F. A. Pickworth,[3] in support of the view that a direct spread of infection from the nasal sinuses to the brain, particularly in the case of the sphenoidal sinus, is responsible for a large proportion of the cases of insanity, showed eleven post-mortem specimens removed from insane patients, in all of which gross infective disease of the sphenoidal sinuses could be demonstrated. While the investigation now being carried out in Birmingham is at too early a stage to allow of final conclusions, it does seem probable that nasal sinus infections form an important factor in the causation of mental disease.

The Influence of Naso-oral Sepsis on the Lungs and Gastro-intestinal Tract.—Infections in the upper and lower respiratory and alimentary tracts often coexist, and there is probably room for still further co-operation between physician, rhinologist, and dental surgeon. E. D. D. Davis,[4] in opening a discussion, pointed out that sepsis in the nose can influence the lower respiratory tract by direct extension or by infection through the blood and lymphatic streams. In the very great majority of cases of chronic nasal suppuration the bronchi and lungs remain uninvolved. This is probably accounted for, on the one hand, by the postnasal discharge being swallowed rather than inhaled, and, on the other hand, by the very effective defence set up by the cough reflexes and the ciliated epithelium. He stated that experiments by W. V. Mullin[5] have shown that infection can spread from the nasal sinuses via the lymphatics of the neck to the glands of the mediastinum and root of the neck. As regards the frequency of sinus suppuration and infection lower down in the respiratory tract, Davis found that of a hundred cases of sinus suppuration, eight showed this association. Cases of pulmonary tuberculosis are liable to secondary infections, and, among nearly five hundred of his cases, nasal infections were present in about 5 per cent, the commonest being atrophic rhinitis. Allied to these cases were those in which pulmonary tuberculosis is simulated by the chronic bronchitis associated with old-standing sinus suppuration. Thirty-seven such cases have been reported by R. T. McIntire, and some of these find their way into sanatoria under a mistaken diagnosis. The clinical picture of intermittent fever, loss of weight, with persistent cough and râles in the chest, is very suggestive. Skiagraphy shows opacity at the hilus of the lung. Treatment of the sinus suppuration in such cases may result in improvement of the lung condition if this has not gone on to the stage of bronchiectasis.

Chronic nasal sinus suppuration and bronchiectasis frequently coexist, but in only some of these is the nasal infection the primary one. In regard to the alimentary tract, cases of gastric and duodenal ulcer do occasionally seem to result from nasal sinus infection, but, as might be expected, oral sepsis is probably a more common cause.

C. A. S. Ridout[6] has found that, in children also, naso-oral sepsis, particularly nfected tonsils and adenoids, may produce a clinical picture of tuberculosis, a number of such cases being referred to him from the tuberculosis clinics. P. Watson-Williams is of the opinion that there has been a real increase in the number of cases of gastric and duodenal ulcer and appendicitis, and he believes that this increase coexists with the prevalence of influenza and its associated nasal sinus infection.

L. H. Clerf[7] states that both clinical observation and experimental study show that nasal sinus disease is a factor in producing bronchiectasis. This type of bronchiectasis can usually be distinguished from the pneumonic or foreign body variety because of its invasion of both lungs. Patients with a chronic cough should always have the sinuses thoroughly investigated.

REFERENCES. [1]*Med. Jour. and Record*, 1927, Oct. 5, 401; [2]*Jour. Laryngol. and Otol.* 1928, Aug., 545; [3]*Ibid.*; [4]*Ibid.* July, 465; [5]*Jour. Amer. Med. Assoc.* 1926, ii. 739; [6]*Jour. Laryngol. and Otol.* 1928, July, 506; [7]*Arch. of Otolaryngol.* 1927, July, 28.

NASOPHARYNGEAL CATARRH.

W. H. Wynn, M.D., F.R.C.P.

The amount of disability caused by disease of the respiratory tract is the subject of a paper by D. K. Brundage,[1] who gives the statistics of invalidism among employees of the Edison Electric Illuminating Co., of Boston, and also those collected by a group of industrial sick benefit societies. The former group includes all disabilities which lasted one working day or longer, whilst the latter includes only cases of illness causing disability for eight days or longer. It was found that roughly half of the total number of absentees and half of the total time lost were due to respiratory diseases. The common cold, which accounted for 70 per cent of the total diseases of the respiratory system, was the worst offender, being six times as common as tonsillar and pharyngeal affections, eight times as frequent as influenza, and more than twenty times as frequent as bronchitis. In spite of the shorter average duration of invalidism resulting from colds, the great excess of cases of this condition made it easily first as a cause of lost working days. The minimum morbidity occurred in July and the maximum in February.

J. A. Glover[2] has made observations on nasopharyngeal epidemics in public schools. All agree that most of the prevalent infectious diseases in schools are spread by nasopharyngeal or 'droplet' infection. At least 80 per cent of all school sickness is caused by direct nose-to-nose or mouth-to-mouth infection. There is a well-marked danger period in the first two months of the Lent term. Glover considers that no immunity to influenza or febricula is conferred by previous attack, and that evidence of the protective value of vaccines is inconclusive. There is, however, some slight evidence that some protection may be afforded against complications, particularly pneumonia. Vaccines, if given, should be administered well before the beginning of the danger period, probably best in November. Intensive prophylaxis during the first half of the Lent term should amply repay the trouble, and he advises: (1) Special efforts to prevent boys returning to school after the Christmas holidays infected with influenza or febricula; (2) Temperature-taking for three weeks; (3) Immediate isolation of all pyrexias and catarrhs; (4) No work before breakfast for at least the first six weeks of the term; (5) All hot baths and showers taken during the day or after games to be followed by cold showers; (6) Prevention of chill in watching matches, sports, etc.; (7) Increased provision for drying clothes, uniforms, and boots. He shows that infection mainly takes place in sleeping quarters, and proper spacing out of beds and thorough cross-ventilation in dormitories are of paramount importance. At least three feet clear space between the edges of beds should be allowed.

S. F. Dudley[3] discusses microbic dissemination in schools on the basis of experience at the Royal Naval School at Greenwich. The failure of isolation to prevent the spread of 'air-borne' diseases is mainly due to two facts. The victims of many diseases are more infectious in the early than the late stages of the disease and have passed the infection on to others before segregation, and many infectious diseases are accompanied by a host of carriers who show no evidence of infection. Droplets are of all sizes, some visible to the naked eye and containing many cells and hundreds of bacteria, others of microscopic dimensions with only a single cell or one or two microbes. The heavy particles all drop to the ground within two or three feet as soon as the propulsive force of the sneeze or cough ceases; but the smaller droplets may remain suspended in the air for half an hour or more according to the atmospheric humidity and temperature, and may be carried to almost any distance according to the force and direction of the prevailing air currents. This explains why contact must be fairly close in order to catch an infectious disease. In many instances only the explosive preliminary jet of heavy droplets will contain enough infective material to cause illness. Each individual has a special degree of resistance, which can deal with quantities of bacteria below a certain minimum number. This varies relatively and actually in every member of the herd and every race of bacteria. If more than the minimal infective dose is received instantaneously, as may happen when a boy receives the full blast of a sneeze in his face, infection is contracted at once. On the other hand, if a boy receives a subinfective dose he proceeds to destroy it and no illness results. If, however, a further subinfective dose is received before the first is inactivated, successful infection will depend upon whether the remains of the first dose added to the second exceeds the minimal infective dose. Infection depends, then, upon the spacing of subinfective doses. The time necessary to contract infection may shortly be stated as the minimal infective dose divided by the difference between the rate at which infective material is received and destroyed. This may be called the *velocity of infection*, and is the chief factor in determining whether a bacterium establishes itself in the host or is destroyed before it can multiply. Also if establishment is successful the velocity of infection still determines whether a symptomatic or symptomless infection results. The absorption of bacteria or their products can cause an increase in immunity. Therefore atmospheres which support droplets containing specific bacteria act as vaccines and augment the resistance to disease of those who breathe them. In this way in schools and ships large numbers of the inhabitants acquire immunity without symptoms of illness by inhaling subinfective doses of bacteria. This is natural auto-inoculation. This has been shown to occur with diphtheria, measles, influenza, and other diseases to which a certain number of individuals of a herd are immune. If the average distance between members of a herd can be increased sufficiently, symptomatic infection will be much reduced, and good may result by an increased resistance to the spread of infection. As dormitories and sleeping quarters are the places where individuals are in the closest contact for the longest time, the average linear distance between the respiratory orifices of individuals is of greater importance than cubic space. Epidemic meningitis was stamped out of soldiers' camps by increasing the distance between their beds from one foot to two and a half feet. Efficient ventilation acts by sweeping out infective droplets and by preventing the humidity of the air from being raised. Other things being equal, the wetter the air the longer the droplets remain suspended. Mouth-breathing during sleep also makes infection more easy. The importance of the spread of disease in sleeping quarters is shown by the difference in morbidity for diphtheria and poliomyelitis in day and boarding schools. Experience shows that a distance of five feet between beds, with good cross-ventilation, would greatly lessen the incidence of nasopharyngeal infections in schools. Dudley suggests that public-school boys might be allowed to sleep in the usual spacious grounds if the deeply rooted traditions of sleeping boxed in by four walls and a roof could be overcome. At present, senior boys are given more spacious sleeping quarters than new boys, whereas the reverse should be the case, as new boys are less resistant. A difficulty with these diseases is that with droplet infection two processes are continually at work—the production of illness which we wish to prevent, and increase of herd immunity which is to be encouraged. Just as the amount of disease is a function of the bacterial density, so is the amount of stimulated immunity. We cannot encourage the latter without increasing the former. At present an efficient prophylactic vaccine against colds has not been obtained. A good vaccine is the ideal method of increasing resistance against droplet infection, as herd immunity could be produced much more rapidly than by Nature's slower methods; this is seen in the case of diphtheria prophylaxis.

References. [1]*Public Health Rep. U.S. Health Service*, 1928, March 16; [2]*Brit. Med. Jour.* 1928, ii, 87; [3]*Lancet*, 1928, ii, 849.

NECK, TUBERCULOUS GLANDS IN. (*See* Tuberculous Glands in the Neck.)

NEPHRITIS. (*See* Renal Disease.)

NERVES, PERIPHERAL, SURGERY OF. *Geoffrey Jefferson, M.S., F.R.C.S.*

Surgical Treatment of Facial Paralysis.—Direct *end-to-end suture* of a divided nerve, be it peripheral or cranial, is the method of election, but hitherto there has been little constructive work on suture of the cranials. Sterling Bunnell[1] reports the first successful union of the seventh nerve within the petrous bone. In his case facial palsy followed immediately on an operation for subacute mastoiditis. Bunnell excised the mastoid scar and opened up the bone fully three months later. The neuroma at the proximal end of the nerve was found adherent to the lateral sinus, which had been exposed at the first operation. The facial canal in its lower part was next laid open in the full length of its vertical portion. The distal end of the facial nerve was found 5 mm. below the point where the proximal neuroma ended, and this portion was freed by gentle dissection. The branches to the stylohyoid and posterior belly of the digastric had to be sacrificed to give full mobility. Four millimetres were removed from each end till healthy nerve fibres were seen, and approximation was effected by four sutures of the finest silk. The vaginal process of the mastoid had to be removed as an early step in order to free the nerve from any tension. The photographs with which this paper is illustrated show that an admirable functional result was obtained. This operation, the feasibility of which has been discussed by many, is definitely a surgical event. Everyone has felt that the various anastomosing operations, which have held the field only for lack of a better, were unsatisfactory.

Not every case of facial paralysis will allow of end-to-end suture, though Bunnell suggests that some examples of Bell's palsy may prove amenable. Palsy due to fracture of the skull, and that which follows the extirpation of large malignant parotid tumours or wounds of the face, cannot be dealt with by direct suture of the facial trunk. For such cases Leriche has advised *extirpation of the superior cervical ganglion*, for immediately after removal patients have proved themselves able to close the eye, though the labial palsy remains. This unexpected and paradoxical result is explained as due to 'chronaxie', the opposite facial giving a branch to the lids, but it only comes into play if the sympathetic is suppressed. J. Jianu and G. Buzoianu[2] give their experience with this operation. They state categorically, as a result of their findings in three cases, that removal of the superior cervical ganglion permits the voluntary closure of the eye and stops epiphora. It is now recommended by Leriche[3] that the cervical sympathetic chain should be cut below the middle ganglion—i.e., low in the neck—for he thinks that the fibres to the eye come off the chain below the middle ganglion.

REFERENCES.—[1]*Surg. Gynecol. and Obst.* 1927, July, 7; [2]*Lyon Chir.* 1928, Jan.-Feb., 10; [3]*Presse méd.* 1926.

NEURALGIA, TRIGEMINAL: SURGICAL TREATMENT.

Geoffrey Jefferson, M.S., F.R.C.S.

The material is accumulating for the writing of an interesting chapter in the history of surgical progress on the evolution of the various types of operations on the Gasserian ganglion for neuralgia. Most practitioners are aware that the old operation, the essence of which was extirpation of the ganglion itself, has given place to a more useful one, namely, section of the sensory root at the back of the ganglion proper. It is more useful because it is easier and has a much lower mortality, whence it can be advised when one would have hesitated perhaps to have prescribed the ablation operation. Since its introduction some years ago by Frazier, of Philadelphia, it has undergone certain refinements, such as the preservation of the motor root, and more lately the sparing of the ophthalmic fibres. The latter is no more than an application to the root operation of the principle of the Hutchinsonian technique developed in this country years ago, whereby the first division was left intact whilst the second and third, together with their proximate piece of ganglion tissue, were removed. It has been discovered that the fibres of the trigeminal nerve from their exit from the pons run forward to the ganglion already grouped as for their final distribution. The fibres which are destined for the ophthalmic division lie above and to the inner side, whilst those to the mandibular division lie below and outermost, the maxillary fibrils occupying a mediate position. The motor division is enclosed in a separate bundle which lies altogether deep to the sensory root. It should therefore be theoretically possible, once the root has been fully exposed, to pick out precisely the fibres corresponding to that part of the face in which pain has been experienced by the patient. Section should give a total anæsthesia of that particular area, with permanent relief of pain.

Byron Stookey[1] discusses these fractional operations, which he calls 'differential sections'. There is good evidence that the ophthalmic portion of the fifth has a separate origin embryologically in men from the rest of the trigeminal nerve. This is certainly the case in fishes. The important point, though, for us is that the ophthalmic fibres can be saved by the observance of certain steps in technique. The reviewer has carried out fractional division many times, and at the present thinks that it is a sound operation.

The problem is not, however, quite so simple as would appear from the perfectly straightforward account of the arrangement of the fibres in the sensory root given above. For it is becoming clear that a perfectly ordered patterning in the root is not a universal rule, although it is in general substantially true. For instance, section of the lower and outer two-thirds of the root in one instance failed to produce anything but the most patchy anæsthesia of the face, although the pain was cured ; and similar bizarre results are not so uncommon as they would be if the design of the root were constant. Another disturbing fact is this, that after subtotal section the anæsthesia, which was at first dense perhaps up to the middle of the cornea, later fades very considerably, so that an indeterminate type of anæsthesia is present some months later. The very fact that the anæsthesia is not absolute causes one to wonder whether the pain will eventually recur, though it has not yet done so in any patient. Should the pain return, a further section will have to be carried out, and this fortunately is as a rule quite easily done. Re-exposure of the root after section is sometimes easier than the primary operation, but this is not the case if heroic measures have been directed against the ganglion itself along old-fashioned lines. Often enough a mass of scar tissue is then found and orientation may be extremely difficult.

The mortality of ganglion removal was high—15 per cent and more. Root section should not give a higher death-rate than 2 or 3 per cent, but obviously must vary with the skill of the surgeon, and more especially with the age and condition of the patient. It is our custom in this country to persist with alcohol injections so long as they are giving relief, and only finally to resort to operation when the patient is many years older than he was when the neuralgia first became intolerable. If the fractional operation stands the test of time, there is no reason why it should not replace alcohol injections, never pleasant things for either patient or surgeon. There is no reason at all why any particular mortality should attach itself to operations on persons of middle age. It is unquestionably the dreadful death-roll of the older operations that renders people still shy of submitting themselves to the new, though the procedure is totally different. Alcohol injections will still hold their place as tests, and it is unlikely that they ever will be completely abandoned, but their repetition will probably be restricted in the not very distant future.

C. H. Frazier[2] and Stookey both hope that fractional division will give permanent cures even if the anæsthesia is not complete. With alcohol this has not been found to be the case, but the parallel is not absolute. For the operation is directed at the fibres behind the ganglion, where regeneration is impossible, whilst recurrence after alcohol usually implies regeneration. Time alone can bring us the answer to these problems. Meanwhile Frazier says that he has not yet met with a relapse, though it is fourteen years since his first cases were done.

W. J. Mixter and F. C. Grant[3] advise the operation of root section or intracranial neurotomy of the second and third divisions for the pain of inoperable carcinoma situated entirely within the trigeminal field. The reviewer has himself performed these operations for this type of case, and has always wondered why it has not been more often employed. (*See* PAIN, INTRACTABLE, TREATMENT OF.)

Alcohol injection into the Gasserian ganglion itself has its supporters, and in carcinoma cases it might be more widely used than the open operation save for the danger of neurotrophic keratitis. H. Ehrenfeld,[4] of Budapest, has devised a head-band carrying an arm which comes down over the cheek. The injecting needle passes through a hole in the arm and is thus steadied in its passage. Most operators like to have the needle free, but this might be a help to anyone learning the technique of the anterior route (the Härtel operation). H. B. Hoppe[5] has performed the direct injection into the ganglion in 125 cases. He has been impressed by the mortality of ganglion extirpation, from which one gathers that section of the root has not been as extensively tried in Germany as in France, where T. de Martel[6] has done 92 retro-Gasserian neurotomies without a death. In Hoppe's hands eye troubles have not occurred, but he is using all the prophylaxis which Härtel has developed (watch-glass protector and atropine). He makes the injection under novocain anæsthesia, and is emphatic that not more than 0·5 c.c. should be injected as a trial, and the same amount of alcohol used. This small quantity will give total anæsthesia if the needle point is really in the ganglion. If complete numbness does not follow the novocain, alcohol should not be injected.

There can be no question that alcohol injections into the ganglion which fail, not only make it unlikely that further injection will succeed, but render operation much more difficult on account of adhesions, whilst eye troubles are more often seen. It seems that the choice between injection and operation will finally be a matter of individual partiality, one man becoming expert at the one method, another excelling at the other. The results and the mortality in the hands of technical masters will be much the same.

References. [1]*Ann. of Surg.* 1928, Feb., 172; [2]*Jour. Amer. Med. Assoc.* 1927, ii, 1742; [3]*Ann. of Surg.* 1928, Feb., 179; [4]*Zentralb. f. Chir* 1928, May 26, 1293; [5]*Ibid.* Feb. 25, 473; [6]*Bull. et Mém. Soc. nat. de Chir.* 1928, Jan. 21, 2.

NEUROSIS, OCCUPATION.

Henry Devine, M.D., F.R.C.P.

By the term 'occupation neurosis' is meant that form of neurosis in which the most prominent symptom is an incapacity on the part of its subject to make the specialized movements which are essential in his craft. In view of the large incidence of this form of neurosis, its study and investigation is a matter of considerable social importance. Usually the incapacity takes the form of a muscular spasm or cramp. It is common in those whose work involves a good deal of writing, such as clerks, secretaries, and copyists. In these cases the malady is described as writer's cramp or scrivener's palsy, as it affects the muscles necessary for writing; and similar conditions, involving different muscles and movements, are met with in telegraphists, pianists, violinists, typists, cutters, hairdressers, cow-milkers, harpists, cigarette-makers, and watchmakers. The spasm does not occur during the process of learning, but only after the subject has become expert in his or her work.

The problem which these cases present has recently been taken up by the Industrial Fatigue Research Board. From the results obtained it is becoming evident that these occupation neuroses are liable to be associated with a number of less prominent, though nevertheless important and significant, neurotic reactions. In a recent article on this subject, the reviewer[1] drew attention to the observations of Janet,[2] made some twenty-eight years ago, which showed that the motor symptoms in the occupation neuroses should not be considered in isolation. Janet showed that the subjects of these occupation neuroses are often psychasthenics, and the dramatic character of the predominant symptom for which they seek advice should not deflect the attention of the clinician from the reaction of the individual as a whole. He gave a number of excellent examples which clearly illustrate the relation of the localized cramp to the general nervous reaction of the patient. The same writer also shows that occupation *phobias* may sometimes develop in nervous subjects. Thus a barber, instead of exhibiting a condition of cramp in the muscles when engaged in shaving, may develop a phobia of razors. Any attempt to shave a client then produces the symptoms of an anxiety neurosis, and the sight of a razor may suffice to make him gasp for breath and sweat profusely, and to fill his mind with obsessive thoughts of death, prison, and the gallows. The symptoms of an occupation neurosis may be localized, also, in the intellectual functions. Thus an accountant may be unable to make a calculation without keen suffering, and that even though he has retained his capacity for using his intellect in other directions.

These facts are being re-discovered by a number of workers who are in a position to submit their clinical material to intensive and statistical study. M. Culpin,[3] in particular, is responsible for an investigation of the incidence of the minor psychoses, with especial reference to their clinical and industrial importance. His work arose from an inquiry into telegraphist's cramp, undertaken by the Industrial Fatigue Research Board, who, assuming cramp to be a fatigue phenomenon, detailed E. Farmer, M. Smith, and M. Culpin[4] to conduct the inquiry. It was found that the cramp showed none of the characteristics of fatigue, but presented a medley of symptoms, of which many seemed to rest on a psychological rather than a physiological basis. Culpin was given the opportunity of interviewing cramp subjects and a control group of non-cramps in order to find out whether the cramp was associated with other symptoms of a recognizably psychoneurotic type. This was found to be the case, the other symptoms being often of a degree which would lead to the diagnosis of a severe psychoneurotic state apart from the cramp; they had often preceded by years the onset of cramp. This result was not unexpected; but, Culpin states, it was disconcerting to find that the controls also showed a considerable, though smaller, proportion of men and women suffering from similar symptoms. The question therefore arose as to whether the proportion was, like the cramp, to be attributed to some feature of the work, or to a phenomenon common to the general community. Thus Culpin was led away from the immediate subject of his research into a study of the incidence of the minor psychoses in the community generally.

Examinations were made of 100 learners in the School of Telegraphy, all of or about the age of 16. Here were found a surprising number of neurotic reactions, often quite severe. Fifty-four were passed as being free from symptoms, 27 showed slight symptoms, and 19 were classed as severe. This pointed to the conclusion that predisposition played a great part in the development of cramp, and indicated the presence of an unsuspected number of people who, even in youth, could be identified as likely to fall victims to disabling symptoms if placed in circumstances that might stimulate the latent psychosis.

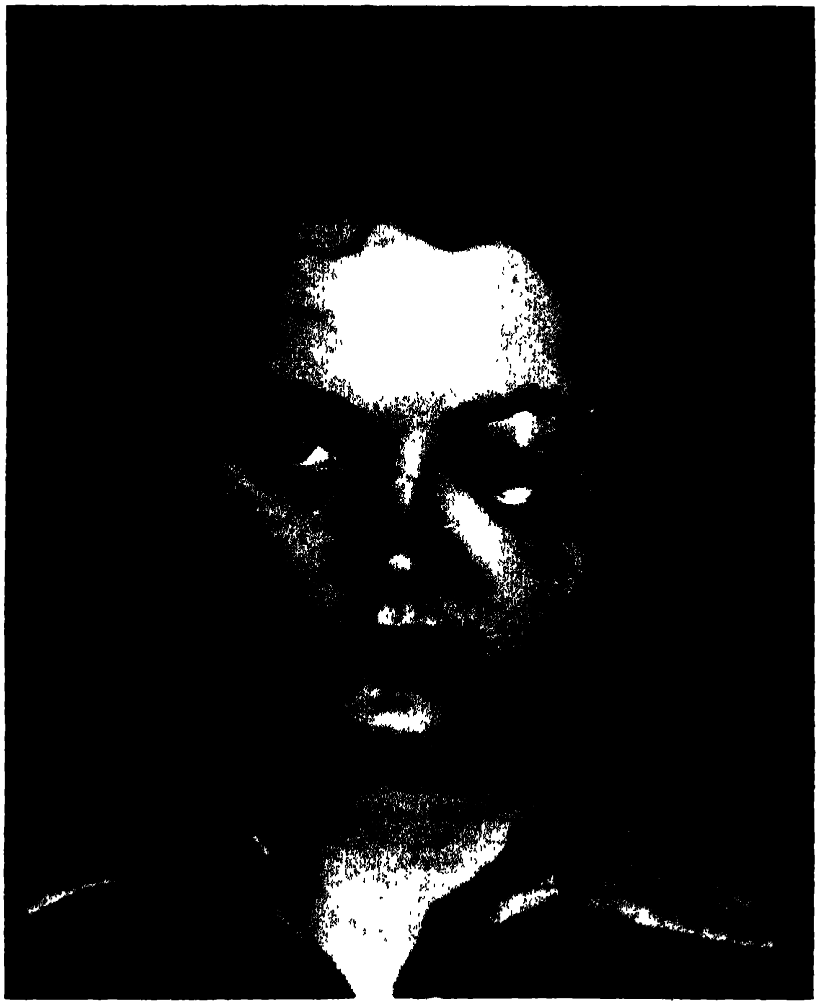
Further to the psychological examination, each subject was tested by means of the McDougall-Schuster dotting machine, the pursuit-meter, and the piezograph, an instrument devised to record the pressure exercised in using the Morse key. The results of these tests showed some correlation with those of the examinations, but the dotting test was finally adopted as an objective check upon the results of the psychological investigation. The results of these investigations on the incidence of the minor psychoses in various establishments are described and discussed under the following headings: time lost through the minor psychoses; method of investigation; day-dreams; noise; post-war cases; standards of assessment; the dotting test; correlation of the dotting test with psychological findings; types recognized at the personal interview; and, lastly, the obsessional subject as revealed by the dotting test; and general conclusions.

The conclusions reached were as follows: (1) The dotting test keeps a check upon the results of the psychological examination. (2) There is a high proportion of people in the general population suffering in varying degrees from the minor psychoses; these may not affect sick-rates in some occupations, but in others may be the cause of considerable loss of time through illness. (3) There is no reason to believe that there is any active selection of particular occupations by psychoneurotic people, except in the case of art students, where the results of the investigation confirm popular beliefs about the 'artistic

PLATE XXXV

SURGICAL EMPHYSEMA OF LEFT ORBIT AND CHEEK

(G. Ewart Martin)



By kind permission of the 'Journal of Laryngology and Otology' temperament'. (4) The results suggest that the commonly supposed 'causes' of psychoneurotic illness are merely factors in exacerbating a previously existing condition. Yet the fact that such illness is absent in some groups indicates the importance of studying exacerbating factors which must be present in those groups with a high sick-rate.

It will have been noted that the study of controls deflected the research away from the original problem of the 'occupation neuroses' into the wider problem of the incidence of 'neuroses in those who are occupied'. We very much hope that further attention will be given to the first of these problems, since in an occupation neurosis we have an extremely crippling disability which would appear to have a psychological basis, or at least psychological elements in its causation. It would thus be extremely interesting to know as to how far it is possible to relieve or cure this definite functional disability by psychotherapy. To cure such a case by this means would afford very definite objective evidence of the utility of the method employed. The older theories assumed that an occupation palsy results from a deranged action of the nerve-centres, a condition which has been termed 'irritable weakness'. The treatment of these cases has not been altogether satisfactory; it has usually taken many months in which it has been necessary to give up the use of the hand involved, as regards the performance of the particular act it is unable to carry out effectively.

It is quite possible that there are a variety of causal factors involved in these occupation palsies. Callewaert[5] considers that writer's cramp is a hyperkinesia rather than a hypertonia, and is of two types—true cramp of constitutional origin, due to faulty technique and curable by re-education; and pseudo-cramp, due to a lesion of the nervous system, simulating true cramp and incapable of cure. The method of re-education utilized consists in teaching the patient to achieve complete relaxation of the muscles involved, and to combine the phalangeal movements necessary in writing with the equally important, but often neglected, movements of the wrist and forearm.

REFERENCES. [1]*Index of Symptomatology*, 1928, 422; [2]*Les Obsessions et la Psychasthenie*, 1901; [3]*Lancet*, 1928, ii, 1277; [4]*Reports of the Industrial Fatigue Board*, No. 43, 1927; [5]*Jour. Neurol. et Psychiat.* 1927, June, 371.

NEUROSYPHILIS. (*See* SYPHILIS OF CENTRAL NERVOUS SYSTEM.)

NOSE, DISEASES OF. (*See also* NASAL POLYPI; NASAL SINUSES, DISEASES OF.)

A. J. M. Wright, M.B., F.R.C.S.

Vasomotor Rhinitis.—In vasomotor rhinitis, or paroxysmal rhinorrhœa, some defect of the endocrine glands has frequently been invoked as a cause. F. J. Novak[1] gives his experiences in the treatment of twenty cases. He finds that in some of them other signs of thyroid inefficiency exist, particularly a low basal metabolism. These were treated with **Thyroid Extract,** ¼ gr. three or four times daily, and, in all, either improvement or cure resulted. In some of them the attacks of sneezing and watery discharge ceased during the administration of the thyroid and recurred on its cessation.

Surgical Emphysema of Orbit due to Sneezing.—Cases of this rare accident are reported from time to time, and it would seem worth while drawing attention to the condition. Two examples are related by G. E. Martin and E. A. Dixson respectively.[2] The accompanying illustration of Martin's case (*Plate XXXV*) gives a good idea of the appearances produced. In each of these cases, on blowing the nose, a sudden swelling appeared in the orbit. On palpation, it presented the typical 'crackling' of surgical emphysema. Examination of the nasal passages and skiagraphy showed no abnormality in either case, and there was no history of injury. The accident is probably due to a congenital defect in the orbital wall of the ethmoid bone, and, apart from the natural anxiety produced in the mind of the patient, does not lead to any ill effects.

Ionization in the Nose.—Ionization in the treatment of chronic middle-ear suppuration has attained considerable popularity, chiefly owing to the work in this country of Friel. Its employment for suppuration within the nose, on the other hand, presents such technical difficulties that it has been little used. A. Campbell[3] has elaborated a technique which he claims to be simple and effective. Essentially, it consists in closing one nostril with plasticine, through which is inserted a metal cannula insulated except for the tip within the nose. With the patient in the prone position, that side of the nasal passages and sinuses can be filled with fluid through the cannula and the latter can then be used as the active terminal (*Fig.* 64).

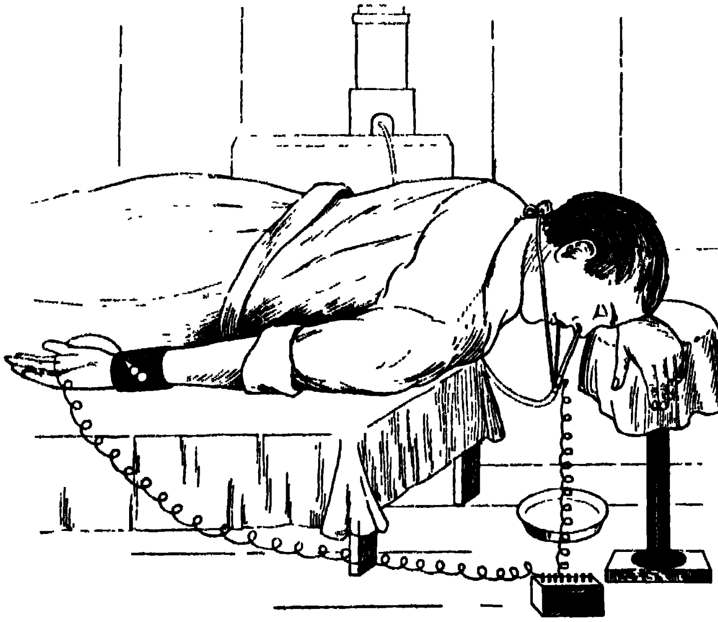


Fig. 64.—Showing the technique of ionization in the nose. The patient is placed on a couch in the prone position, with the forehead resting on a head-rest, while the chest is at the edge of the couch. (*By kind permission of the 'Journal of Laryngology and Otology'.*)

In actual practice the following technique is adopted: (1) The insulated catheter is moulded with plasticine and the latter is smeared with vaseline. (2) With the patient lying supine on the couch, the plasticine and catheter are introduced into the nostril. (3) The patient turns to the prone position and rests his head on the head-rest. (4) A piece of tape is attached to the loop of the catheter and fastened round the head, to prevent it from slipping out of the nose and to support the weight of the electrode and rubber tubing which are attached to the catheter. (5) The tubing is attached to the catheter and the solution turned on so that it fills one-half of the nasal cavity, and overflows, drop by drop, into the other; the indifferent electrode is fixed to the arm, the active electrode is connected to the catheter, and the current is turned on. The catheter acts as electrode and cannula combined.

The method is of most use following operation on the sinuses, when the cavities can be more easily filled with the solution, and the general dosage, etc., does not vary from that employed in the case of the middle ear (*see* MEDICAL ANNUAL, 1927, p. 120).

REFERENCES.—[1]*Ann. of Otol. Rhinol. and Laryngol.* 1927, Sept., 829; *Jour. Laryngol. and Otol.* 1928, May, 340; [3]*Ibid.* Feb., 98.

OBESITY.

W. Langdon Brown, M.D., F.R.C.P.

M. W. Goldblatt, J. Forest Smith, and H. Gardiner Hill[1] have made a clinical and metabolic study of 294 cases of obesity by means of the blood-sugar curve and the respiratory exchange. It is rarely that one can attribute obesity to gluttony. The large majority of obese subjects are found in a class which is not over-endowed with worldly possessions. Nevertheless, in every case there must be an increase of caloric intake over caloric output. They group in the *exogenous* class those subjects where there was a clear history of excessive consumption of food or diminution of energy expenditure; these only formed one-third of the total. In the *endogenous* group they place those where obesity was present from birth, or developed at puberty or after childbirth. Cases of obvious endocrine disease were excluded. In the former group tolerance to glucose was normal or diminished and practically never increased. By grouping according to age, a process of continuous diminution of carbohydrate tolerance could be detected, leading in some cases to actual glycosuria. Oxidation was, however, in general good, and we appear to be dealing with an extreme deficiency in the power to store carbohydrate. The frankly endogenous case starts its career with an increased tolerance, but this falls and ultimately becomes subnormal, while in the extreme cases oxidation is definitely defective. That there is a close association between obesity and some cases of diabetes has long been known (von Noorden pointed it out, calling some cases of obesity "latent glycosuria"), and we can trace this in the gradual fall of sugar tolerance. [It is strange that a careful study like this leads to so little distinction between exogenous and endogenous obesity. It still remains true that "we do not as yet know why certain individuals form fat".—W. L. B.]

H. J. John[2] maintains that statistics prove that the mortality-rate is not affected by underweight until an extreme condition of under-nutrition is reached, whereas the effect of increasing weight on the death-rate is very marked. He draws attention to the well-recognized risk of thyroid administration in obesity.

A. Minnig[3] finds an increased basal metabolic rate in a fairly large percentage of obese patients; this he refers to other endocrine glands having secured the upper hand. L. Bauman,[4] on the other hand, thinks that the rate undergoes a compensatory rise during periods of overfeeding. If this is so, an increased basal metabolic rate in obesity should be clear evidence of an exogenous origin [But I have noted an increased basal metabolic rate in obese women suffering from virilism due to frank endocrine disease. W. L. B.]

TREATMENT.—B. Gordon and E. von Stanley[5] have suggested an ingenious and, at first sight, paradoxical method of treating obesity with **Dextrose.** Meals consist of proteins and fat in restricted amounts, the total for the day being 1200 to 1400 calories. Then dextrose is given to the extent of 100 to 400 calories during muscular exertion, or when there are symptoms of fatigue, hunger, nervousness, or weakness. The loss of weight which followed could be explained on the basis of insufficient food for maintenance during periods of rest, the dextrose supplied during exercise being sufficient to prevent symptoms from hypoglycæmia. Glucose is so rapidly assimilated that the excessive consumption of starch as so often practised by obese individuals to relieve symptoms of hypoglycæmia becomes unnecessary, and therefore this source of fat formation is lessened. The plan seems worth trying, for it is becoming more generally recognized that hunger and exhaustion are often due to hypoglycæmia, which can be readily remedied by a small dose of sugar representing a lower caloric intake than required in other forms of food.

REFERENCES.—[1]*Quart. Jour. Med.* 1928, Jan., 325; [2]*Med. Jour. and Record,* 1927, Oct. 19, 476; [3]*Ibid.* Aug. 3, 171; [4]*Jour. Amer. Med. Assoc.* 1928, i, 22; [5]*Amer. Jour. Med. Sci.* 1928, Jan., 87.

OCCUPATION NEUROSIS. (*See* NEUROSIS, OCCUPATION.)

ŒSOPHAGUS, DISEASES OF. *A. J. M. Wright, M.B., F.R.C.S.*

Acute Œsophageal Spasm.—Cases of œsophageal spasm usually tend to vary in degree but to be progressive over long periods. J. Guisez[1] has, however, drawn attention to a type in which spasm occurs acutely and completely at its first onset, thereby producing at once a critical condition. He relates several such cases, emphasizing the suddenness and completeness of the first attack without any previous history. The spasm usually takes place during the bolting of food, and clinically resembles that associated with an epithelioma or an acute paralysis. The diagnosis can only be established by œsophagoscopy, which usually shows the spasm to be situated at the entrance to the œsophagus. More rarely it is found at the lower end, or at both. The cause of the condition is unknown. Progressive and forcible dilatation with bougies is always successful.

An Œsophageal Analgesic.—J. Guisez[2] has found the following analgesic preparation to be most useful as a preliminary to the passage of bougies, or in painful œsophageal conditions whatever their nature. Its use was first suggested by Surmont and Tipriz in 1924, and it consists of a 4 per cent suspension of **Scuroform in Almond Oil,** the former being an insoluble, and hence non-toxic, analgesic.

Congenital Œsophageal Obstruction.—A. L. Abel[3] points out that congenital malformation of the œsophagus is not very rare, but almost always proves rapidly fatal. As a result of one case which he was able to save, he considers that it is possible that early diagnosis and treatment may save a proportion of others.

VARIETIES.—There are seven types of the condition, namely—total absence, doubling, œsophagotracheal fistula, partial obliteration, diverticulum formation, simple congenital stricture, and membranous stricture. Clinically, the important ones are the curable types, which are congenital diverticulum, simple stricture, and membranous stricture. The *congenital diverticulum* is similar to the adult diverticulum, and produces similar symptoms, but is extremely rare. *Simple congenital stricture* shows a definite narrowing of the œsophageal wall at one or more places, this narrowing being either circular and confined to a small area, or extending along a considerable length. Commonly the stricture is towards the lower end. *Membranous stricture* is caused by a membrane which constitutes either a ring-like fold or a complete diaphragm, and is generally situated above the cricoid.

SYMPTOMS AND DIAGNOSIS.—Cases of both simple and membranous stricture have been recorded in which symptoms were not produced until the child attempted to take solid food, which was almost immediately regurgitated. Life can be maintained on liquid food, and patients have lived for many years before the lesion has been discovered. These patients are naturally very underdeveloped and thin. On the other hand, the obstruction may be complete and fluids be regurgitated from birth. X rays and an œsophageal examination will decide the exact condition present. If left untreated, the majority of cases die. In the less severe degree, ulceration and even perforation of the œsophagus above the stricture may take place.

TREATMENT.—Simple strictures are best treated by slow gradual **Dilatation** by bougies. After the preliminary passage of a bougie with the œsophagoscope, others may be passed blindly once or twice a week, care being taken only gradually to increase the size and to use no force. With an annular membranous stricture, it may be necessary always to pass the bougies under direct vision. Gastrostomy must be employed if the patient is much emaciated, and if this has been done, a continuous thread may be employed as a guide for passing hollow rubber bougies. Abel relates an interesting case in which he was able to rupture a complete membranous diaphragm with the œsophagoscope in a child two days old. A subsequent examination with X rays showed some narrowing at the site of the diaphragm.

Cicatricial Stenosis of the Œsophagus.– Cases of cicatricial stenosis of the œsophagus are not common in this country, and, when met with, are usually due to the swallowing of caustic alkalis. Although X rays and the œsophagoscope have enabled treatment to be more effective, it still remains difficult and prolonged. The extreme tightness of the strictures and their frequent multiplicity are factors of great importance. Treatment essentially consists in slow and continuous **Dilatation,** and many ingenious methods have been devised for carrying this out. G. Portmann[4] has now described an addition to these in which the normal peristaltic movements slowly insinuate a series of dilating olives through the stricture. The essentials of the method are briefly as follows: A gastrostomy is first performed, and, after healing has taken place, a filiform bougie is passed down from above into the stomach, guided by the œsophagoscope. The end of this bougie is then brought to the exterior through the gastrostomy wound. This is carried out by first washing out the stomach, and, after dilating it with water, seizing the end with an operating cystoscope. A silk thread is then attached to the distal end of the bougie and the latter withdrawn, thus leaving the thread through the stricture and out at the mouth and opening. Three graduated metal olives, with the smallest below, are then slid down the silk to the stricture. These gradually insinuate themselves into, and through, the stricture, thus dilating it. The passage of the olives takes from three to six days, and when they have passed into the stomach they are withdrawn, being replaced by a larger series. Treatment must be prolonged into months or even years.

X-ray Examination. X-ray examinations in the case of œsophageal strictures, of whatever nature, are usually carried out with the patient in the erect posture. By this method the upper limit of the stricture is outlined on the screen or plate by the barium paste which has been swallowed, but no information is given as to the length or conformation of the stricture: any opaque mixture passing through is seen as a thin streak, whatever may be the size of the œsophageal lumen below. A. Eiselsberg and M. Sgalitzer[5] have described a simple method by means of which it is possible to outline the lumen of the œsophagus, or even of the deep pharynx throughout its length. If the illustrations given are typical, the method should be of considerable utility. It consists in the swallowing of the barium and subsequent examination being carried out in the horizontal posture. As a result of this, the whole length of the œsophagus fills with opaque mixture and is outlined in detail. In examining the patient in the horizontal posture, it is better to irradiate from a purely lateral position. The patient lies completely on one side, with the shoulders drawn firmly backward and the hands clasped together behind the back, to get the shoulders out of the way. The head is supported by sandbags and the knees drawn up. The barium mixture, of a medium consistency, should be swallowed in the horizontal position.

Carcinoma of the Œsophagus.—A very considerable amount has been written on this subject during the last year. The forms of treatment to which attention is now being directed are: removal of the growth by an external operation; the use of radium, X rays, diathermy; and dilatation or intubation of the stricture.

Removal by Operation.—In such attempts at removal as have been made in the past, approach has been gained by an incision on one side of the vertebral column, the pleura being displaced. This method of approach is a poor one, the growth, when exposed, lying at the bottom of a deep pit. W. H. C. Romanis and D. F. A. Neilson[6] have employed, as an alternative, an approach through the pleural cavity. An artificial pneumothorax is first produced on the selected side, the operation being carried out two or three days later. The pleural cavity is opened through a long incision round the side of the chest between two ribs, cutting through the intercostal muscles and pleura, and then separating the ribs with two powerful retractors. A large opening is thus produced through which both hands can be introduced and the whole chest explored. Apart from the freer access which this method of approach would seem to give, it has the theoretical advantage of opening through the pleural cavity rather than the posterior mediastinum. As a result, infection, if it occurs, should be less dangerous. The operation was carried out on three cases, and although in none of these could removal of a growth be carried out, in all the operation seemed to have upset the patient very little, so that the mere risk of exploration by this route does not seem to be great. Of the three cases, in two it was found that the growth was too extensive to permit of removal, and in the third a mistake in diagnosis had been made, the case being one of simple spasm. The authors conclude that this method provides a reasonably easy route of approach to growths of the œsophagus, particularly at the lower end, but they emphasize the fact that, for success, earlier diagnosis is necessary.

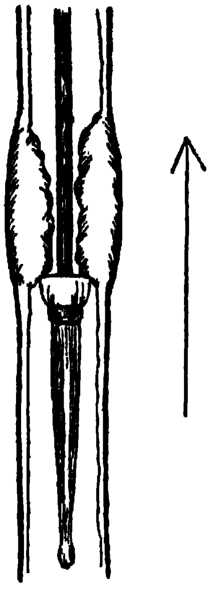


Fig. 65.—Electrode devised by A. J. M. Wright for use in diathermy treatment of carcinoma of œsophagus. Showing the electrode passed below the growth preparatory to treatment.

(*By kind permission of the 'British Journal of Surgery'.*)

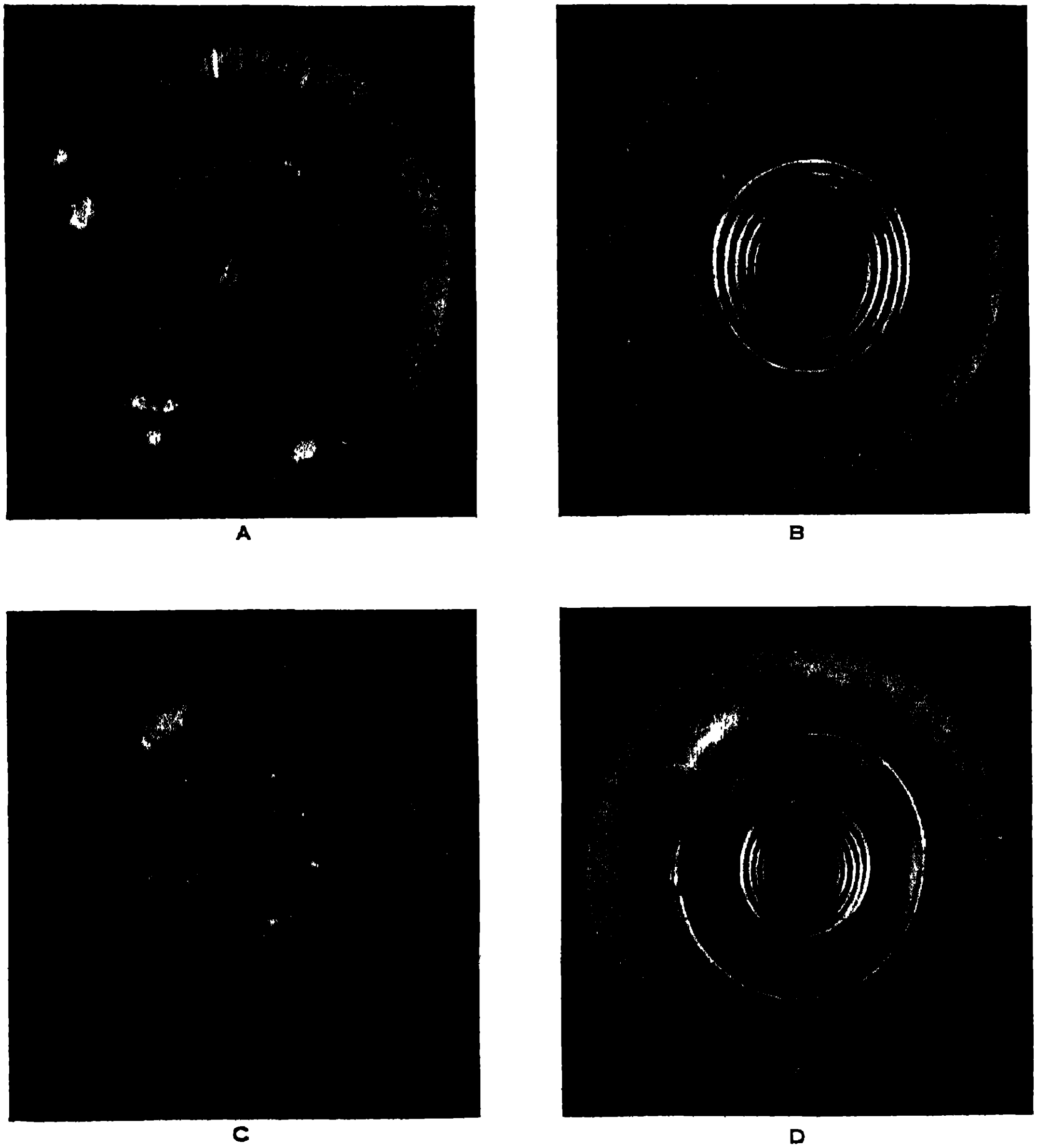
Treatment by Radium.—The improvement in the results of radium treatment for malignant disease in other parts of the body by the implantation of multiple small screened doses has induced J. Muir[7] to try and adapt a similar technique for use in the œsophagus. He has devised a special œsophagoscope through which radon seeds screened with platinum can be embedded in the growth under direct vision. The seeds have an attached thread so that they can be removed. The method has been employed for too short a time for any final results to be given, but the six cases so far treated have shown encouraging improvement. F. R. Herriman[8] has employed Muir's technique on nine cases, and has been much impressed with his results.

Treatment by Intubation.—A number of references have previously been made to H. S. Souttar's[9] method of intubation in this disease. He has now published full details of the method. As a result of the study of clinical and post-mortem material, he has come to the conclusion that œsophageal carcinoma is not, as is commonly stated, a growth of low malignancy, but that it extends rapidly, the relative infrequency of secondary deposits in distant parts being due to the fact that, owing to its situation, vital organs are involved at an early date by a spread of the primary disease. He considers that radical removal by operation is never likely to be a successful method of treatment, and that therefore means of palliation must be of primary importance. He has elaborated his method of intubation with an extensive special instrumentarium. Broadly, the malignant stricture must first be dilated under direct vision through the œsophagoscope, the flexible metal tube of German silver wire being then passed down into the stricture with a special introducer, its upper expanded end resting on top of the growth

PLATE XXXVI

CARCINOMA OF THE ŒSOPHAGUS ŒSOPHAGOSCOPIC APPEARANCES

(H. S. SOUTTAR)



A, Growth completely encircling œsophagus. Tight stricture absolute obstruction. **B**, Tube in place. Functional success immediate. **C**, Soft fungating growth, with secondary nodule at higher level. **D**, After intubation with tube and rubber cone. Note secondary nodule above level of tube.

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(*Plate XXXVI*). Although Souttar uses special instruments which no doubt facilitate intubation, anyone with a reasonable experience of œsophagoscopy will find the special dilators and introducers not essential. With the original type of tubing, trouble was sometimes experienced from the tube being regurgitated, but in the later types the screw-like contour employed has obviated this.

Treatment by Diathermy.—The good results obtained with diathermy in malignant disease of the tongue and pharynx has led A. J. M. Wright[10] to devise a method of using it for malignant disease of the œsophagus. While the upper end of the growth can be brought under direct vision through the œsophagoscope, it is impossible to tell how far down the growth extends. A terminal was therefore devised which would act from below upwards (*Fig.* 65). It consists essentially in a Jackson's bougie with a metal collar of mushroom shape forming the active electrode. This is passed beyond the stricture, under endoscopic vision, and then withdrawn until the resistance of the lower end of the growth is felt. The current is then turned on and gentle traction made, and in this way the projecting portions of the growth are removed and the surface coagulated. The method has been employed in a number of cases with considerable temporary relief and without undue risk to life. A post-mortem specimen from a case dying of intercurrent disease, shortly after treatment, showed that the method of application was effective.

REFERENCES.—[1]*Bull. d'Oto-rhino-laryngol.* 1927, Jan.; [2]*Ibid.*; [3]*Brit. Med. Jour.* 1928, ii, 46; [4]*Laryngoscope*, 1927, Oct., 753; [5]*Surg. Gynecol. and Obst.* 1928, June, 837; [6]*Lancet*, 1928, i, 386; [7]*Laryngoscope*, 1927, Sept., 660; [8]*Ibid.* 664; [9]*Brit. Jour. Surg.* 1927, July, 76; [10]*Ibid.* 71.

OPHTHALMIA NEONATORUM. (*See* CONJUNCTIVA, DISEASES OF.)

OPTIC NERVE, AFFECTIONS OF. *Lt.-Col. A. E. J. Lister, I.M.S. (retd.).*

Acute Optic Neuritis due to Suppuration in the Antrum.—H. Lagrange and P. Matthicr[1] report a case of typical optic neuritis due to the above cause. Vision on the morning of operation was nil. Operation revealed pus in the antrum, previously indicated by X rays. Two days after operation the perception of light returned. Two months later, sight was completely restored.

Treatment of Optic Atrophy by Sulphur.—L. Winkler[2] says that though treatment of general paralysis of the insane by inoculation with malaria has been successful in many cases, it has been less so in tabes dorsalis. It has, moreover, been reported that in cases in which optic atrophy was present, rapid deterioration of vision has resulted, so that C. Behr and others advise that it should be either not used at all, or used with the greatest caution. Of four such cases treated by the author by inoculation with malaria, rapid deterioration of vision in both eyes occurred in one, so severe that the malaria had to be brought to an end. This led the author to seek another means of therapy. He has tried **Sulphur** in five cases. For full details the original paper must be consulted. Briefly he uses parenteral injections of 0·5 to 1 per cent of sulphur in olive oil. At the same time injections of **Bismuth** are given. There seems to be a conflict of opinion as to whether the action of sulphur is a specific one or whether its action is similar to that of protein therapy. The author discusses the matter, and quotes the opinions of various workers on this point. He thinks the results of the treatment of his five cases are encouraging, and he hopes to go on with the treatment and report further later on. In one case the condition remained stationary for eighteen months. In one rapidly progressing case the vision was improved, and remained so after eight months' observation. Two of the cases remained stationary for three and four months respectively. [As the condition is such a grave one, and the treatment is at least much easier to carry out than intracisternal injections of mercurial compounds and other drastic methods of treatment which have been advocated, it seems worth a trial, even on the very slight evidence that a study of the cases affords. There does seem, however, to have been a very definite improvement in one case both as regards vision and recovery of the central colour vision, which before treatment was absent.—A. E. J. L.]

Treatment of Optic Atrophy in Tabes by Malaria.—M. Fischer-Ascher[3] has treated eighteen of these cases at Prague; 4 to 8 c.c. of blood were injected. This was taken from a known **Malaria** patient at the beginning of an attack. After eight or nine attacks of malaria, treatment by **Quinine** and **Salvarsan** was begun. None of the patients had been energetically treated before, but several had had inadequate antispecific treatment. The results are inconclusive. The author notes, however, that in more than half the cases the vision and the visual field remained the same.

Treatment of Tabetic Optic Atrophy by Atropine.—C. Abadie[4] believes that optic atrophy of tabes is due to a permanent spasm of the central retinal arteries and consequent failure of nutrition of the nerve-fibres. For some time he has been treating this by **Atropine.** Starting timidly, he now gives intravenous injections of 2 mgrm. of atropine in 2 grm. of distilled water daily. The syphilis is treated with injections of **Cyanide of Mercury.** The good effects only commence at the end of one or two months.

REFERENCES. [1]*Proc. Soc. Ophtal. de Paris*, 1927, July; [2]*Wien. klin. Woch.* 1928, March 15, 374; [3]*Klin. Monatsbl. f. Augenheilk.* 1926, lxxvi, 102; [4]*La Clin. Ophtál.* 1926, June (abstr. *Brit. Jour. Ophthalmol.* 1927, 350).

ORAL SEPSIS. (*See* DENTAL SEPSIS.)

ORIENTAL SORE.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

Sand-fly transmission of *Leishmania tropica* is recorded by S. Adler and O. Theodor,[1] who found that 9 experiments with flies infected for only two to seven days were all negative, but of 19 trials after development of the parasites in the flies for from eight to twenty-one days 6 gave positive results, indicating a biological cycle in the sand-flies, before the completion of which they are uninfective. This cycle takes eight days at a temperature of 19° to 23° C., and five generations of flies and man have now been infected successively, and the experimental lesions showed the same histological changes as in natural infections. A sand-fly will bite repeatedly even when gorged, thus accounting for the occurrence of multiple Oriental sores. The shortest incubation period was seventeen days, and specific agglutinins were demonstrated in two of the experimental cases. The same workers[2] record cultures of the *L. tropica*, and they found that its pathogenicity is greatly diminished in cultures *in vitro*, and is raised by passage through sand-flies. Further, sand-flies are found containing *L. tropica* flagellates near the œsophageal valve, and when they ascend the pharynx and buccal cavity are capable of transmitting the infection, so they accept the Indian work on the development of *L. donovani* in *P. argentipes* as proof that this insect is capable of being a carrier of kala-azar infection. They also found that *L. infantum* behaved similarly to *L. tropica* in *P. papatasii*. In another paper S. Adler[3] records the direct transmission of *L. tropica* from one *P. papatasii* to another by means of placing the washed contents of the infected mid-gut of an infected fly in a membrane of rabbit's skin, and feeding a fresh fly on it. A case of Oriental sore of seventeen years' duration containing the parasites is described by D. U. Owen,[4] although the usual duration is given by different writers at one-half to two and a half years.

TREATMENT.—A brief analysis of treatment in 337 cases of Oriental sore is recorded by P. V. Karamchandani,[5] who found the average period of cure by intravenous **Tartar Emetic** to be eighteen days in 300 cases, by **Operation** by excision or scraping to be twenty-five days in 20 cases, by **X Rays** once a fortnight to be six weeks in 5 cases, and by **Berberine Sulphate** in weekly injections to be fourteen days in 5 cases. He thinks the last-mentioned remedy is the best and should be given a good trial.

REFERENCES.- [1]*Ann. Trop. Med. and Parasitol.* 1927, July 22, 89 ; [2]*Ibid.* 111 ; [3]*Trans. Roy. Soc. Trop. Med. and Hyg.* 1928, Aug. 22, 177 ; [4]*Ann. Trop. Med. and Parasitol.* 1928, June 12, 43 ; [5]*Ind. Med. Gaz.* 1927, Oct., 558.

OSTEOMYELITIS, ACUTE.

E. W. Hey Groves, M.S., F.R.C.S.

Acute inflammatory infection of the long bones continues to be a subject of great practical importance. Cases of this disease are certainly becoming much less frequent than they used to be a generation ago. Probably this diminished frequency is due in part to the much greater care which is now given to children of school age, particularly in the removal of septic foci such as those contained in carious teeth or inflamed tonsils. The comparative rarity of the disease has, however, a disadvantage in any critical consideration of methods of treatment. Few surgeons see more than three or four cases every year, and even from large hospitals the total number of cases to be collected is seldom large enough to draw very conclusive deductions.

R. Kennon[1] has contributed a most valuable paper on this subject, in which he lays great emphasis on certain points connected with the early diagnosis. He holds that in every case there is to be found a very definite point of maximum tenderness on pressure over the affected bone. These points usually correspond with the metaphysis which is mostly responsible for the growth of the bone—for example, the antero-internal aspect of the neck of the humerus, the anterior surface of the lower end of the radius, the posterior aspect of the lower end of the femur, and the antero-internal aspect of the upper end of the tibia. The existence of this point of maximum tenderness

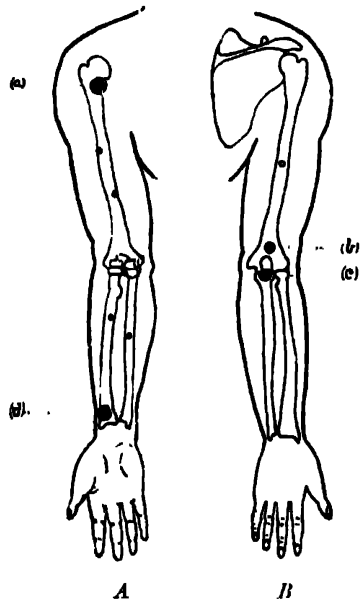

Fig. 66.—Maximal points of tenderness in early cases of osteomyelitis: upper extremity. *A*, Anterior aspect. *B*, Posterior aspect.

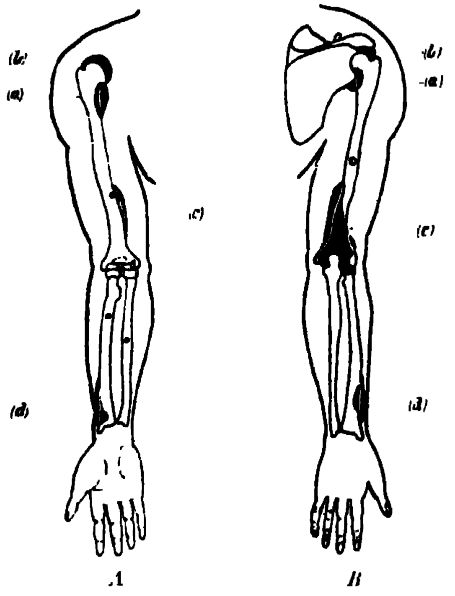

Fig. 67 -Sites of subperiosteal abscesses from osteomyelitis: upper extremity. *A*, Anterior aspect. *B*, Posterior aspect.

not only serves to distinguish the case from one of arthritis, but also indicates the position of the incision which should be made in the treatment of the case (*Figs.* 66–70). Another fact of great importance is that the X-ray picture is practically negative in the early stages of the disease, and that it is quite wrong to be led by this negative finding to postpone operation. The whole aim of treatment in the early stages should be to cut the disease short before any extensive change has taken place in the bone, either of rarefaction or of sequestration.

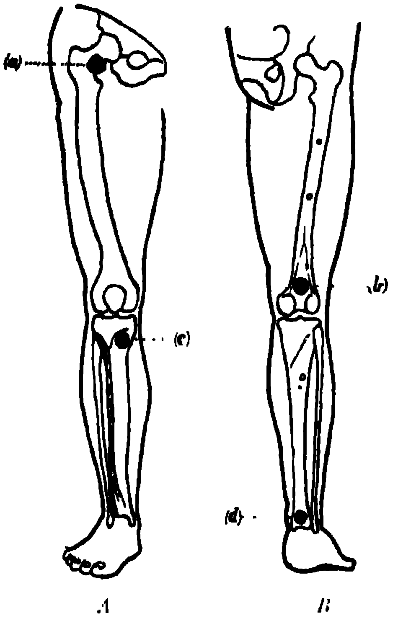

Fig. 68. Maximal points of tenderness in early cases of osteomyelitis: lower extremity. *A*, Anterior aspect. *B*, Posterior aspect.

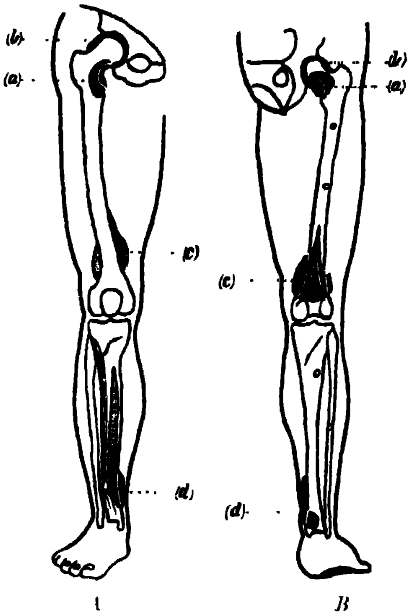

Fig. 69. Sites of subperiosteal abscesses from osteomyelitis: lower extremity. *A*, Anterior aspect. *B*, Posterior aspect.

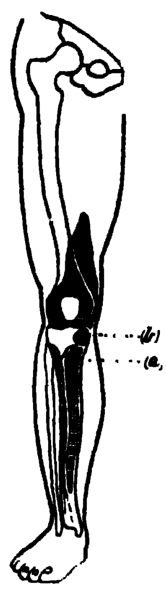

Fig. 70.—Sites of subperiosteal abscesses from focus at the upper end of the tibia.

(*Figs.* 66–70 *by kind permission of* '*Surgery, Gynecology and Obstetrics*'.)

H. W. Orr[2] has made certain suggestions in the treatment of acute osteomyelitis which have attracted great attention in America and have aroused considerable controversy. In the first place he cuts down upon the affected focus and opens the shaft of the bone by a gutter of some length—that is, about a third or a quarter of the length of the diaphysis and deep enough to expose the marrow cavity. He then packs the whole cavity with vaseline gauze after washing it out with spirit and painting the skin edges with iodine. No sutures of any kind are used, the wound being packed widely open. The whole limb is then put up in a plaster case, which includes the joints above and below the inflamed bone. In the illustrative case which he quotes, that of a child 6 years old, a double plaster-of-Paris spica cast was applied and left in place without any window or without any change of dressing for six weeks, at the end of which period the plaster was removed and the vaseline pack changed. A new single spica cast was then put on for a month, at the end of which time the wound was soundly healed. The author of this daring method attaches great importance to the avoidance of irritating antiseptics and frequent changes of dressing. He also considers that absolute fixation of the limb and of all the muscles attached to the bone is essential for rapid healing.

In the consideration of this novel proposal one is inclined to reject it as dangerous and unreasonable. In advocating such a method it would have been desirable, not merely to give one illustrative case, but to record without exception every case in which the method had been tried. It is evident, however, from the standing and position of the author, and from the comments on his methods made by his colleagues and by those who have used it, that there is a great deal to be said in its favour. If it can be safely employed, it will achieve a great simplification of treatment and a very great diminution of suffering in the avoidance of frequent dressings. In the discussion of Orr's method great divergence of opinion was expressed. W. M. Brickner[3] in particular urges that no attack should be made upon the bone itself until a sequestrum has formed. But surely it is the whole object of timely treatment and of early drainage to prevent the formation of a sequestrum. Other speakers were far more inclined to rely upon the Carrel-Dakin method of sterilizing the wound than merely upon a vaseline pack. We certainly await the publication of an extended list of cases treated by Orr's method with very great interest. In the meantime we would point out that every case of osteomyelitis should be treated on its own merits. There are some cases in which the disease is chiefly a local infection of one bone, but in the majority the disease is from the outset a true septicæmia with one or more bone foci. The first point of importance is to recognize these foci of bone infection, and to cut down upon them and freely drain both the subperiosteal and the marrow cavities. By this means life is saved in a great majority of cases, but the further conduct of the case must be determined by the fact that smooth healing may take place, or on the other hand sequestra may form and may have to be removed. It seems to be quite certain that any attempt to cut short the disease by an extensive removal of the diaphysis in its early stages is a dangerous and a useless method. It cannot be predicted in the early stages of the disease how much necrosis of bone will occur. Ideal treatment will avoid any necrosis. The removal of the diaphysis before sequestration or before the formation of an involucrum is a procedure which will almost certainly lead to a flail limb.

REFERENCES. [1]*Surg. Gynecol. and Obst.* 1928, July, 44; [2]*Jour. Bone and Joint Surg.* 1927, Oct., 733; [3]*Amer. Jour. Surg.* 1928, May, 476.

OVARIAN HORMONES, THE. *W. Langdon Brown, M.D., F.R.C.P.*

The stimulus to ovarian function can only be obtained through adult tissues, whether male or female (Hammond and Marshall), for a young ovary engrafted into an adult male or female will begin secreting earlier than its age warrants, while an adult ovary engrafted into a young animal will not function until the animal reaches maturity. So that while puberty cannot occur without the gonads, the gonads evidently do not initiate the changes, but are dependent on general maturation. In infantilism, therefore, the ovaries are not necessarily at fault, and ovarian transplantation will not necessarily improve the patient. This is in accordance with the observation that a chronic disease of any vital organ—e.g., congenital heart disease, bronchiectasis, or nephritis which begins sufficiently early in life—may produce infantilism without any disease of the gonads.

To understand the ovarian hormones it is necessary to consider phases in the ordinary life-cycle of ovarian activity, which have been stated by Beckwith Whitehouse[1] as follows: (1) *Anœstrum*, or period of rest, during which the uterine glands are small, and the Graafian follicles do not reach the surface of the ovary. This phase is lacking in human beings. (2) *Pre-œstrum*, a period of endometrial growth and functional activity, during which ripe follicles project from the surface of the ovary. (3) *Œstrum*, accompanied by a profuse secretion from the endometrial glands, with slight vaginal desquamation, and, in some animals, slight hæmorrhage. Fertilization is effected during this stage. (4) *Pregnancy or pseudo-pregnancy.* The variation between these is really only one of degree. In both the corpus luteum appears and continues throughout the phase. The uterus undergoes increased vascularity and its glands have a secretion rich in calcium. This is followed by involutionary changes, accompanied in some animals by a decidual necrosis or cast.

Wilfrid Shaw and others have shown that ovulation occurs between the thirteenth and seventeenth day of the human cycle, from which date a state of pseudo-pregnancy exists until about the twenty-eighth day of the cycle, when necrosis of the menstrual decidua takes place and external hæmorrhage begins. But simultaneously with this a new pre-œstral stage has begun, to which some of the bleeding is due. The phases overlap. Thus from puberty to the completed menopause the healthy endometrium is never at rest; it is always either functioning or preparing to function. There is little evidence in favour of any period of complete sterility. The pre-ovulation stage is very variable in length, while the post-ovulation stage is relatively constant. Fertility is highest in the earlier part of the cycle, falling rapidly from the sixteenth to the twentieth day (S. A. Asdell[2]).

According to W. E. Dixon,[3] apparently at least three different hormones correlated with these different events can be obtained from the ovary:—

1. *Œstrin.*—This is a thermostabile liquid soluble in all lipoid solvents. It is probably produced by the Graafian follicles, most abundantly just before menstruation, and can be obtained from the fluid of the ripe follicles. R. T. Frank and M. A. Goldberger[4] could not find it in the circulating blood from the twenty-third to the tenth day before menstruation. Then it appears, causing increased turgescence of the breasts and uterus, rises in amount till the onset of menstruation, when it disappears from the circulation to appear in the menstrual blood. In the circulating blood of pregnant women it gradually appears during the third month, this probably being associated with the establishment of the placenta. It is present in considerable quantity in the placenta, and has also been found in the thyroid gland. It is abundant in post-partum bleeding. If it is absent from the circulation after the twelfth week of pregnancy it connotes the death of the fœtus. Three tests are used for its detection: (*a*) The presence of cornified cells in the vaginal smear; (*b*) The production of œstrus in spayed animals, or of puberty in young animals before its proper time; (*c*) The effect on the type of contraction of the isolated uterus.

There is some evidence that the production of œstrin is influenced by the anterior lobe of the pituitary and that it may be present in the thyroid. The standardization of this hormone has been a matter of difficulty, but the unit is defined as the least amount of lipoid extract that will produce œstrus in the spayed adult rat. For clinical purposes it should be put up in ampoules containing 10 rat units per c.c. A woman's ripe follicle contains 3 to 5 units. Œstrin promotes the building up of the endometrium, and if given in sufficient amount will provoke a continuous œstrus or, in pregnant animals, abortion.

Frank and Goldberger usually found, if a patient had menorrhagia, that the hormone was present in the circulation in increased amount at times when it should be absent. They consider that the prognosis of amenorrhœa depends on whether there is none or merely a reduced amount of it present in the circulation. If this hormone is present in sterile women, the cause of the sterility must be sought elsewhere than in the ovary. It has been used clinically for amenorrhœa, sterility, and the vasomotor disturbances of the climacteric.

2. *Corpus Luteum Hormone.*—Recent work has re-established Fraenkel's view that the function of the corpus luteum is to prepare the endometrium for the embedding of the ovum and its maintenance there. It inhibits ovarian

secretion between œstra and particularly during pregnancy, and it prevents ovulation. That is, while helping to maintain pregnancy, it prevents such activities as would then be useless. But if it persists after delivery it will prevent proper involution of the uterus and leads to sterility. If it is removed it releases normal ovarian function and produces abortion. Injection of its extract causes hypertrophy of the breasts and, during pregnancy, growth of the maternal portion of the placenta.

Clinically, the use of luteal extracts has been rather disappointing, probably because sufficient care has not been taken to distinguish between active and degenerated corpora in their preparation. The writer has, however, seen it successfully used in the prevention of habitual abortion, and in other cases thus treated has noted the speedy cessation of a persistent flow of milk, apparently due to an over-acting pituitary gland.

3. *Interstitial Hormone.*—This water-soluble and thermostabile substance was prepared by Dixon and Marshall by maceration of the ovary with warm saline, followed by boiling and filtering. The injection of this substance into animals causes a secretion of the posterior lobe of the pituitary which, passing by way of the cerebrospinal fluid into the blood, renders the uterus highly responsive to stimuli. The active principle is presumably oxytocin, one of the constituents of pituitrin. Now this hormone is apparently only elaborated when the corpora lutea are degenerate. As long as the corpora are functioning, they control the situation and neither œstrin nor oxytocin is free to act. But when the corpus luteum degenerates at the end of pregnancy, this interstitial hormone is released to stimulate the pituitary gland to exert its oxytocic effect. These experiments have been confirmed in human beings by Mayer, who found that the cerebrospinal fluid removed from women during Cæsarean section excited labour pains when injected into parturient women with uterine inertia. It is not suggested that this endocrine mechanism is the sole factor in producing labour pains; the distention produced by the fœtus must be a direct stimulus to the intense muscular contractions, but the onset of labour cannot easily be accounted for without some such mechanism as here described. As Dixon says, it is remarkable that medical men, in using pituitary extract to stimulate uterine contractions, should have adopted the method which nature has employed from time immemorial. And it may be added that they used it empirically before this chain of events was known.

The functions of these three hormones may be briefly expressed thus—the first promotes fertilization and conception, the second provides for the retention of the fertilized ovum in the uterus, and the third initiates parturition.

In general terms ovarian hormones co-operate with the catabolic endocrine group which activate the sympathetic. Conformably with this, R. F. Matters[5] has shown that there is an increased sensitivity to adrenalin during pregnancy. Thus Loewi's adrenalin eye test is normally positive then, while adrenalin excites glycosuria more readily at that time.

Other gynæcological applications of this work have been made. Thus Beckwith Whitehouse[1] believes that excess of the second hormone is a factor in the production of severe menstrual pain, while failure of the follicles to rupture is a cause of sterility and irregular uterine hæmorrhage by cutting off the supply of this hormone. R. F. Matters[5] has found ovarian grafting combined with crude ovarian therapy effective in amenorrhœa and sterility. W. P. Graves[6] believes that ovarian substance is almost specific in the treatment of hot flushes and the vasomotor disturbances of the menopause. J. H. Hannan[7] points out that the tone of the sympathetic nervous system is increased at the menopause in women. There is a rise of blood-pressure before and a fall during the flushing. He believes this is largely due to the unrestrained activity of the adrenals, and considers that thyroid extract should not be then administered, as is so frequently done, because it has an adrenal-sensitizing action. On the other hand, ovarian extract is useful at such times.

The whole subject is evidently complicated by the varying action of these three different hormones, and we can agree with E. C. Dodds,[8] whose paper should be consulted, that the clinical study of ovarian hormones is really only just beginning. For an extensive review of the whole subject see also a paper by A. S. Parkes.[9]

The reviewer[10] has reported cases of *virilism* in women pointing to hormonic disturbance of the secondary sexual characters. They appear to fall into the group described by Achard and Thiers under the name of 'diabetes of bearded women'. There are six characteristics, of which only the first three are essential: (1) Hirsuties on the face—masculine in type; partial baldness of the frontal region. (2) Obesity. (3) Disturbed genital functions. (4) Cutaneous striæ, which may be very striking. (5) High blood-pressure. (6) Glycosuria or lowered carbohydrate tolerance. Another point noted by the reviewer, to which the authors above named did not call attention, is an increased basal metabolic rate. Necropsy usually shows an adrenal or pituitary lesion, or both. The earlier in life that such virilism is produced the greater the structural change, amounting to pseudo-hermaphroditism; if the exciting cause comes into action during the childbearing period the changes are mainly those of function. In one of the reviewer's cases the first symptom which led to the detection of an adrenal tumour was the obsession on the part of the patient that she was turning into a man.

REFERENCES.—[1]*Edin. Med. Jour.* 1927, Sept., 139; [2]*Jour. Amer. Med. Assoc.* 1927, ii, 509; [3]*Brit. Med. Jour.* 1927, ii, 1070; [4]*Jour. Amer. Med. Assoc.* 1928, i, 106; [5]*Med. Jour. Australia*, 1928, April 28, 520; [6]*Jour. Amer. Med. Assoc.* 1927, ii, 1308; [7]*Brit. Med. Jour.* 1927, ii, 14; [8]*Lancet*, 1928, i, 1107; [9]*Biological Rev.* 1928, July; [10]*Amer. Med.* 1928, Jan., 53.

OVARY, CARCINOMA OF, IN INFANCY.

Beckwith Whitehouse, M.S., F.R.C.S.

Whilst sarcoma of the ovary has been noted relatively often during infancy, carcinoma of this organ is extremely rare in the very young. V. C. Hunt and H. Simon[1] record a case occurring at the Mayo Clinic in a baby girl, age 17 months. The child appeared to be normal at birth, but a month before admission to the clinic a vaginal discharge was noted resembling the menstrual flow. The breasts were unusually large and the pubic hair was excessive. The tumour reached to the level of the umbilicus. At the operation 1500 c.c. of ascitic fluid were present in the peritoneal cavity, and a large solid encapsulated tumour was found in relation to the right ovary. The left ovary and the uterus appeared to be normal. The tumour weighed 1000 grm., and microscopically presented two types of structure: a solid type with large polyhedral cells predominated; in a few areas a glandular arrangement with papillary ingrowths occurred.

This interesting case falls into line with other recorded instances of ovarian tumour in children, in the coexistence of precocious puberty. As Hunt and Simon point out, this is a true homosexual precocity, the breasts and external genitalia developing in a manner similar to that which is normal at puberty. With neoplasms and hyperplasia of the suprarenal cortex, the precocity is of the male type: if the patient is a male, the masculine characteristics are accentuated; if a female, precocity is heterosexual, and consists of hypertrichosis, enlargement of the clitoris, and commonly a change in voice.

REFERENCE.—[1]*Ann. of Surg.* 1928, Jan., 84.

PAIN, INTRACTABLE, TREATMENT OF. (*See also* NEURALGIA, TRIGEMINAL.)

Geoffrey Jefferson, M.Sc., F.R.C.S.

In previous issues of the MEDICAL ANNUAL reference has been made to methods of dealing by operation with intractable pain, in particular the pain of inoperable malignant disease. It is the fact that the majority of those who eventually die from carcinoma suffer no more pain than can easily be controlled by morphia. The rare exceptions form a pitiable group, those to whom opium gives only a temporary respite and pain becomes intense the moment they awake. These sufferers can often be helped by surgery, and it is remarkable how well they stand operation which will essentially be directed to the division of nerves.

Chordotomy.—Experience with this operation is increasing, and it seems to have come to stay, being much more immediately successful than the posterior-spinal-root sections which it has superseded. P. Banzet[1] in a *Thèse de Paris* reviews thirty cases from the clinic of Sicard and Robineau. It will be recollected that the operation consists in the division of the spinothalamic tract of the spinal cord—the tract which carries the pain fibres for the opposite half of the body. It is chiefly of service in patients who have hopelessly painful affections of the pelvis and lower limbs (e.g., inoperable or recurrent carcinoma of the uterus or rectum), and is most easily performed in the upper thoracic region. Spiller and Frazier, the originators of chordotomy, first suggested this site, the object being to cut the tract high up, for the pain fibres are believed to take several segments to cross and reach their final grouping. More recent experience casts some doubt on this, as a deep section gives analgesia almost up to the root level of the cord incision. With incomplete section it is certainly true that only the most caudal parts of the body are rendered pain-free. It is possible, as the reviewer has learned from experience, to obtain an analgesic level only as high as the knee as a result of a light section at the fourth thoracic segment. The section must be a full 3 mm. deep in its whole extent, or the operation may have to be repeated. The operation is scarcely yet one of absolute precision, for the tract varies a little, but it is quite certain that this conduction bundle can be divided without serious or permanent injury to the pyramidal pathway. A further advantage is that, whilst pain conduction is stopped, the ordinary touch and discriminatory sensations are not interfered with, though temperature sense is lost. In order that the operator may control with more certainty the upper limit of the area which he is depriving of pain, some surgeons (de Martel, Förster) do the operation under local anæsthesia and test the result with a pin before the wound is closed. This is an advance, if it can be carried through. The reviewer has tried it once, but the patient was unable to tolerate any manipulation of the cord. This could be overcome by local application of novocain or pledgets of wool, but the local anæsthetic might confuse the interpretation of the pin test on legs and trunk. This objection may not be so serious in actual practice as it seems in theory. It has been said that the site of election for chordotomy is the upper thoracic region. Förster prefers a high cervical section (opposite the axis), and thinks it is easier there.

The results of chordotomy in the cases described by Banzet are as follows: 58 per cent result perfect, 17 per cent imperfect, 20 per cent doubtful, 10 per cent died. In the cancer cases there was a mortality of 25 per cent, but this figure has no special meaning, as it must largely depend on the state of exhaustion of the patient at the time of the operation. He notes, as post-operative troubles, motor affection of the leg 36 per cent (this figure is much too high in the reviewer's opinion), and bladder troubles 76 per cent (also too high). It seems as if the incision in these cases had been made too far back. Banzet's figures are not out of the way if they refer to the few days following operation, for these troubles are common enough then; but they should soon pass off and leave the patient an ambulant and continent individual.

Intractable Pain in Carcinoma of the Head and Neck.—Such operations as chorodotomy are of course impossible for the relief of pain in extensive malignant disease of the mouth and throat, but we have, in section of the sensory root of the trigeminal nerve, the counterpart of the older posterior-spinal-root section. This operation can as well be applied to the cancer patient as for the more orthodox neuralgic (*see* NEURALGIA, TRIGEMINAL), and it will in all probability come into more extended use for these sufferers also. The patients often have two kinds of pain - one from the original growth and one from the metastasis in the neck, the latter usually the less severe, but with the habit of becoming more evident and troublesome once the severer pain elsewhere is relieved. For those cases in which the growth is situated wholly within the trigeminal field, great relief is afforded by operation on the trigeminus or its branches. But actually the buccal cavity and pharynx have a complicated nerve-supply. W. J. Mixter and F. C. Grant[2] prefer the intracranial neurectomy of the second and third divisions of the fifth nerve, and sometimes go on immediately to the excision of the growth with the cautery knife. The whole operation can be carried out under local anæsthesia - a great advantage, for the patient can sit up and assist greatly by his co-operation. If the growth involves the floor or contents of the orbit, upper part of nose, or forehead, section of the sensory root of the fifth will be substituted. Sometimes a well-placed alcohol injection may be used instead of the operation. Posterior-root sections of C. 2, 3, and 4 may be done if the prospects of life and the severity of the pain warrant it. Grant and Temple Fay have both performed these operations with good results, for once the pain is relieved the patients may improve wonderfully.

Temple Fay[3] has interested himself particularly with the problem of that referred pain deep in the ear so characteristic of fixed carcinoma of the posterior third of the tongue and fauces. Section of the fifth nerve does not cure this, but section of the roots of the vagus does (*see* MEDICAL ANNUAL, 1928, p. 405). Fay performed his earlier vagotomies intracranially by a suboccipital approach, retracting the cerebellum. This is a very difficult operation, and once he had satisfied himself that the vagus was the means of reference of this deep aural pain, he devised an extracranial attack on the sensory fibres of the vagus, leaving the motor part intact. The approach is by incision along the posterior border of the sternomastoid high up. The branches of the cervical plexus encountered there are cut or avulsed. The deep fascial plane behind the muscle is then entered, the carotid sheath reached, and the vagus nerve isolated and followed up to the base of the skull. Sensory branches will be seen leaving the vagus at several points, and these are cut. He thinks that the hypoglossal nerve carries some sensory fibres to the base of the tongue (these are derived ultimately from the vagus), so that the nerve is best divided. Of the patients Fay has operated upon, three were rescued from a state of invalidism and made fit to resume their former occupations until their deaths, seven, nine, and fourteen months after operation. One still had deep pain in the ear till her death eighteen months later, but the amount of anodyne required was greatly reduced. Four other patients remained free from pain until death. Fay is impressed with the manner in which these denervated patients tolerate radiotherapy, for they do not have the very painful reactions which are so troublesome to the average sufferer.

REFERENCES.—[1]"La Chordotomie", *Thèse de Paris*, 1927; [2]*Ann. of Surg.* 1928, Feb., 179; [3]*Jour. Amer. Med. Assoc.* 1928, ii, 375.

PANCREAS, DISEASES OF.

A. Rendle Short, M.D., F.R.C.S.

Acute Pancreatitis.—This condition was the subject of a discussion at the fifty-day conference of German surgeons in Berlin, 1927, and a great number took part. G. von Bergmann,[1] opening, stated that this is one of the few conditions in which we can reproduce in animals the exact picture of a disease in man. The essence of it is the liberation of trypsin, which digests the tissues, including the pancreas itself. Pain in the left epigastrium is more often than not due to some form of pancreatic disease. Aids to diagnosis are the presence of diastase in the urine (though this is not conclusive) and the absence of trypsin in the duodenum. This test is performed by making the patient swallow the duodenal tube, and introducing ether. It may cause a typical attack of the pain, which is valuable evidence, but unpleasant for the patient. He believes that if mild attacks are recognized, violent outbreaks with necrosis and hæmorrhage may be averted by injecting **Trypsin** to secure immunity.

V. Schmieden[2] says that in one-third of the cases there is some disease of the biliary tract, and that this ought to be treated when the pancreas is operated on. At the same time he evacuates the exudate, splits the capsule of the pancreas, incises the parenchyma, and establishes free drainage. In a compilation of 1278 cases the mortality was 51·2 per cent for the past eight years. Only by early operation is it possible to get good results. When the bile-passages are treated the results are improved, as the following table shows:—

Table I.—OPERATIONS PERFORMED IN CASES OF ACUTE PANCREATIC NECROSIS IN WHICH THE BILIARY OPERATION WAS DONE AT THE SAME TIME.

	RECOVERED Per cent	DIED Per cent
Cholecystostomy	55·6	44·4
Choledochostomy	60·0	40·0
Cholecystectomy and drainage of the common duct	64·0	36·0
With biliary care	61·3	38·7
Without biliary care	40·7	59·3
Cholecystectomy	49·4	50·6
Choledocho-enterostomy	20·0	80·0

The formidable list of complications is given in *Table II.*

Table II.—COMPLICATIONS FOLLOWING ACUTE PANCREATIC NECROSIS.

	CASES
Diabetes (3 deaths in coma)	18
Chronic pancreatitis	6
Recurrences (6 occurring within 2 months after operation)	26
With associated treatment of the biliary ducts	7
With treatment of pancreas only	19
Re-operation (10 cured; 7 died)	17
Cyst formation	4
Persistent fistula	5
Adhesions	3

Geary Grant[3] reports a series of 12 cases treated by himself and colleagues, of which four recovered. Two were treated by drainage of the pancreas and two by cholecystostomy. He accepts the theory which attributes acute pancreatitis to invasion of the duct by septic bile. In one case there was a stone in the ampulla of Vater, and Schmieden records this on no less than seven occasions amongst 31 cases of pancreatitis associated with gall-stones. These observations are of course strongly in favour of the regurgitation theory.

Another short series is reported by R. P. Watkins.[4] Of 18 patients treated by laparotomy 10 died. The methods followed were much as above.

A. Roseno and W. Dreyfuss[5] point out that acute pancreatitis may give rise to a palpable swelling which may be mistaken for perinephric abscess. In another communication[6] they record encouraging experiences with the introduction of antiferment substances.

Pancreatic Calculi.—E. C. Lindsay,[7] who has already reported one case of this rare condition, now relates a second. The patient was a man of 48, and the main symptoms were severe pain in the upper abdomen with vomiting and a palpable swelling. Calculi were shown in the skiagram, and glycosuria was present. On opening the abdomen, the head of the pancreas could be felt crunching like a bag of sand. The stones were dislodged and the duct explored with a Desjardin's forceps, and a drainage-tube was sewn in and wrapped in a tube of omentum and brought out through the wound. The gall-bladder was also drained. The patient made a good recovery.

Cancer of the Pancreas.—E. D. Kiefer,[8] setting out the history and findings in 33 cases, takes occasion to contribute a good review of a discouraging subject. It is rather commoner in men than women, and the usual age is between 40 and 60. The most common symptoms, in order of their frequency, were: cachexia, jaundice, pain, nausea or vomiting, indigestion, and constipation. In 17 cases the patient came up for jaundice, and in 9 for pain. The cachexia—meaning thereby loss of weight, anorexia, weakness, and anæmia—is apt to be marked, and out of proportion to the other signs. The jaundice is very deep—so-called 'black jaundice'.

The pain is of three types: That most often seen is a steady dull epigastric pain, which may be severe, radiating through to the back. The second is violent and paroxysmal, beginning at the umbilicus and also radiating to the back, also to the front of the chest; it may be relieved by flexing the body; this type of pain usually precedes the jaundice. The third type of pain is like gall-stone colic. In late cases there may be œdema of the legs and ascites. Examination of the abdomen may show an enlarged gall-bladder, and less often some enlargement of the liver too. A tumour mass is only found in about one-fourth of the cases. A low-grade fever is often met with. Glycosuria is the exception, even when extensive destruction of the pancreas has taken place. The stools may contain excess of fat (7 out of 33 patients). X-ray examination does not usually show anything. The duration of life is about five months. At autopsy the growth is most frequently found in the head of the pancreas, especially in the jaundiced cases. Metastases are found in the lymphatic glands along the anterior border of the pancreas and in the portal fissure, and in the liver.

When chronic jaundice is present, the diagnosis has to be made from gall-stone in the common duct. The cachexia almost always present in cancer of the pancreas is the best clue; also the jaundice is progressive and unremitting. If the gall-bladder can be felt enlarged, that is good though not infallible evidence of cancer (Courvoisier's law). Chronic pancreatitis presents a clinical picture very like that of cancer, but the history is longer. Even at operation the differential diagnosis may be in doubt, unless the surgeon can find a metastasis in the liver. When jaundice is absent the diagnosis is difficult, though there may be a tumour mass. [In the reviewer's experience, the severe pain going through to the back, with cachexia, and a negative X-ray investigation, lead one to the truth.—A. R. S.] The special tests for pancreatic disease are all unreliable, but as a rule the duodenal secretions are absent from the bowel.

It is usually worth while to explore the abdomen, on the off-chance of finding something more hopeful, such as a gall-stone or chronic pancreatitis. If cancer is discovered in a jaundiced patient, he will be relieved of his pruritus and dyspepsia by a cholecystenterostomy, though it is not likely to prolong life. In a few cases—Finney's being the most striking - a cancer of the body of the pancreas has been excised, with the tail, and the patient has lived for many months in comfort.

REFERENCES. -[1]51 *Tag. d. deutsch. Ges. f. Chir.* Berlin, 1927 ; [2]*Surg. Gynecol. and Obst.* 1928, June, 735 ; [3]*Brit. Med. Jour.* 1928, i, 1101 ; [4]*New England Jour. of Med.* 1928, May 10, 605 ; [5]*Zentralb. f. Chir.* 1928, Jan. 14, 80 ; [6]*Arch. f. klin. Chir.* 1928, March, 64 ; [7]*Lancet*, 1928, i, 700 ; [8]*Arch. of Internal Med.* 1927, July, 1.

PANEL PRACTITIONERS AND PRESCRIPTIONS.

Joseph Priestley, B.A., M.D., D.P.H.

A common-sense view has been taken by the East Sussex Insurance Committee on the question of alleged over-prescribing for a panel patient. A practitioner prescribed for a panel patient a proprietary preparation of colloidal iron combined with malt extract. Objection was taken by one of the Ministry of Health's regional medical officers, with the result that this particular treatment was discontinued, on account of its cost. This decision of the regional medical officer strikes at the whole root of the matter. Under the Insurance Acts, panel patients are entitled to the best treatment from their doctors, and, consequently, no prescribing medical practitioner should be liable to have his views questioned by a regional medical officer. If such a revision of treatment is necessary, it can *legally* be effected by the panel committee or other appeal tribunal. Such is the East Sussex Insurance Committee's view. It must be emphasized that every panel patient is entitled to the best possible treatment that a panel doctor can give or suggest, and that no question should be raised.

PARALYSIS, FACIAL. (*See* NERVES, PERIPHERAL.)

PARALYSIS, GENERAL. (*See* DEMENTIA PARALYTICA.)

PARALYSIS, INFANTILE. (*See* POLIOMYELITIS, ACUTE.)

PARATHYROIDS, THE.

W. Langdon Brown, M.D., F.R.C.P.

Not much work has appeared during the past year on these glands. After the interest aroused by Collip's discovery of the parathyroid hormone (to which the name 'parathormone' is frequently given), and the work directly stimulated by this discovery, there has been a pause. Nevertheless we have arrived at a more accurate idea of the rôle played by the parathyroids in calcium metabolism. O. Bergeim[1] maintains that calcium is absorbed by the small and excreted by the large intestine to such an extent as to cause a negative calcium balance in the absence of vitamin D. In the presence of this vitamin this excretion of calcium is checked. It would appear, therefore, that vitamin D directly influences calcium metabolism. On the other hand, C. P. Stewart and G. H. Percival[2] find that the parathyroid hormone produces a rise in the calcium content of the blood even after complete removal of the alimentary tract. Moreover, there is no diminution in the excretion of calcium salts by the large bowel following administration of the parathyroid hormone when the serum calcium is high. The conclusion from both sets of observations is that parathormone mobilizes calcium from the tissues into the blood. It is therefore useless in rickets, merely abstracting calcium from tissues already deficient in it. Stewart and Percival concluded that the tissues from which it is drawn are the bones and muscles. Lehmann and Cole showed that parathormone delays rather than hastens the calcification of fracture callus, which would agree with the above observations. W. Hueper[3] reports metastatic calcification in various organs, including the kidney tubules, from overdosage with parathyroid hormone, which suggests caution in its use. It would appear, therefore, that this hormone materially alters the calcium distribution in the body, abstracting it from some tissues, such as the bones and muscles, to heap it up in others, e.g., the kidney. As stated when dealing with post-operative tetany in the article on the thyroid (see THYROID), calcium is apt to be deposited in the lens of the eye when the blood calcium has become low, so that the hormone is needful to prevent calcium deposits in this tissue.

Dosage in Tetany.—A. M. Hanson[4] has adopted a method of standardization of the hormone based on the amount required to restore the blood calcium to normal in parathyroidectomized dogs. The dosage he recommends in tetany in man is 30 to 60 units every twelve hours for five or six days, followed by an interval of seven to fourteen days, after which the treatment may be repeated. In severe tetany following operation, however, it may be necessary to continue the injections over a long period, preferably keeping the calcium level slightly above normal.

REFERENCES. [1]*Jour. Biol. Chem.* 1926, Sept., 58; [2]*Biochem. Jour.* 1927, xxii, 301; [3]*Arch. of Path. and Lab. Med.* 1927, Jan., 11; [4]*Jour. Amer. Med. Assoc.* 1928, i. 747.

PARATYPHOID FEVERS. (*See also* TYPHOID FEVER.) *J. D. Rolleston, M.D.*

EPIDEMIOLOGY. E. P. Snijders,[1] who reports two undoubted and two probable cases, remarks that paratyphoid fever A is very rare in Holland, although it is possible that some cases escape recognition. All his patients had come from Central America, where paratyphoid A is endemic. A study of the prevalence of paratyphoid A shows that it goes hand in hand with typhoid fever, and is an indication of bad fæcal hygiene. The disease is therefore almost unknown in England and Holland, and uncommon in Germany, in which countries the incidence of typhoid fever is low, but it is commoner in France, Italy, the Balkans, and South Russia, where the incidence of typhoid fever is high. Paratyphoid A epidemics, however, die out sooner than those of typhoid fever, partly because the paratyphoid A bacillus is less resistant, and partly because there are much fewer paratyphoid A carriers than typhoid carriers. Lastly, paratyphoid A carriers get rid of their bacilli more rapidly than typhoid carriers.

I. V. I. Ward[2] reports an epidemic of 140 cases of paratyphoid fever B which occurred in West Hertfordshire. The source of infection was a girl in a dairy, 3½ years old, who had been supposed for some time to be ill with bronchopneumonia but was found to have a strongly positive Widal reaction to paratyphoid B. Her mother, who handled the milk, had a similarly positive reaction, and paratyphoid bacilli were found in her stools. Examination of the roundsmen at the dairy showed that six apparently well were carriers, paratyphoid B bacilli being found in their stools, and in one or two occasions in their urine.

SYMPTOMS AND COMPLICATIONS.—G. Pansini[3] records a case of *paratyphoid A meningitis* in a girl of 4. Lumbar puncture gave issue to a clear fluid under considerable hypertension. Cytological examination showed a predominance of lymphocytes with a few polymorphonuclear cells. The fluid agglutinated *B. paratyphosus A* in 1–150, and the same organism was grown from the fluid. The serum agglutination test was positive in 1–200. Death took place after eighteen days' illness. There was no autopsy.

O. Crouzon and S. de Sèze[4] report an outbreak of 20 cases of paratyphoid fever among the nurses at La Salpêtrière. It was at first regarded as influenza, and the possibility of enteric was not considered, especially as all the patients had been inoculated, until one of them presented a persistently high temperature, enlargement of the spleen, and rose spots. A blood culture was then made and revealed *B. paratyphosus B*. Subsequently a number of other nurses developed characteristic clinical symptoms of enteric. Bacteriological examination showed that the condition was paratyphoid B in 14 cases and paratyphoid A in 3 others. In another 3 cases no bacteriological examination was made and the diagnosis of paratyphoid fever was made on clinical grounds only. Of the 20 patients, 15 had been inoculated with T.A.B. vaccine fourteen months previously and 5 several years before. The present outbreak confirmed the general rule as to the extraordinarily mild course of enteric in the inoculated. Apart from one nurse who had a temperature of 104° for about three weeks, all had mild attacks, the average duration of the disease being twelve days. The fact that the inoculations had been performed more than a year previously partly accounts for the lack of immunity, especially as no cases occurred among the nurses who had been inoculated two to twelve months previously, and partly to the fact that the patients had been given only 1½ c.c. of T.A.B. vaccine instead of 3 c.c.

Pieper and Rosenstern[5] report an outbreak of 138 cases of paratyphoid B which occurred in a municipal children's home in Berlin. Five of the patients were adults, and the rest children. The commonest form observed was that of acute gastro-enteritis. Much less frequent was a dysenteriform type (colitis paratyphosa), of which about 20 cases were seen. The typhoid form was not observed. All recovered. The epidemic was found to be due to the consumption of rissoles which had been prepared by a kitchen maid suffering from febrile diarrhœa which proved to be paratyphoid fever.

J. Madier and R. Ducroquet[6] report the case of a boy, 5 years of age, who on the fifteenth day of a febrile attack developed *arthritis* of the right knee and ankle. The limb was put up in plaster and the arthritis subsided, but on the thirtieth day pain and swelling of the right hip developed. X rays showed a destructive lesion of the neck of the femur. The pain disappeared under treatment with rest in a plaster apparatus, but a skiagram taken five months after the onset showed complete disappearance of the head of the femur. The Widal test was positive in 1-50 for *B. typhosus*, negative for *B. paratyphosus A*, and positive in 1-800 for *B. paratyphosus B*. J. T. Lewis[7] reports a case of arthritis of the left knee-joint due to *B. paratyphosus B* without general symptoms in a female infant of 14 months. A thick glairy exudate from which *B. paratyphosus B* was grown was withdrawn by puncture of the joint. The patient's serum strongly agglutinated standard *B. paratyphosus B* cultures in 1-500, but gave no reaction with *B. typhosus* or *B. paratyphosus A*. The joint became normal at the end of a month's treatment with an autogenous vaccine.

A. N. Kingsbury, J. E. Lesslar, and M. Kandiah,[8] who record two illustrative cases, state that in paratyphoid fever C the onset is usually sudden and the duration depends on the severity of infection and the degree of involvement of the respiratory system. Bronchitis and patches of bronchopneumonia are not uncommon, and the causal organism may sometimes be isolated from the sputum. The duration of the disease does not exceed five to six days in mild cases, and, as the mortality rate is low, few descriptions of post-mortem findings have been published. Some congestion of the upper part of the small intestine has been noted, as well as congestion and small superficial erosions of the mucous membrane of the colon.

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PEMPHIGUS. *A. M. H. Gray, M.D., F.R.C.P., F.R.C.S.*

TREATMENT.—L. Hollander[1] has treated six cases of pemphigus with **Whole-blood Transfusion.** Marked improvement in the general and skin condition resulted in five out of the six cases; the sixth, whose skin condition also improved, died of an intercurrent acute infection. The patient's blood is typed, and 500 to 600 c.c. of blood from a donor of corresponding type is transfused at weekly intervals from three to six times.

The following untoward symptoms have been noted: (1) A tingling sensation in the toes or fingers; (2) Numbness of the extremities; (3) Palpitation; (4) Air-hunger; and (5) Signs of appearing cyanosis. When any of these symptoms has arisen, the author has discontinued the transfusion and given 10 min. of 1–1000 adrenalin chloride intradermically. Later reactions, such as chills, are treated by external applications of heat.

REFERENCE. [1] *Brit. Jour. Dermatol. and Syph.* 1927, Nov., 450.

PERIARTERIAL SYMPATHECTOMY. (*See also* TUBERCULOSIS OF BONES AND JOINTS; VASCULAR SURGERY.) *E. W. Hey Groves, M.S., F.R.C.S.*

This operation, which was suggested by Leriche during the War for the treatment of a case of causalgia, has since that time been very greatly extended in regard to its indications and results, whilst a great deal of experimental work has been done in order to elucidate the rationale of the method. Lying in the adventitia of each large artery is a plexus of sympathetic nerve-fibres together with certain nerve-ganglia. The operation consists in dissecting away the loose sheath from all sides of the artery for a distance of 6 to 10 cm. Everything is removed down to the muscular coat of the artery, but the latter must be spared from any injury, otherwise there is a danger of the arterial wall giving way. This procedure will be easy or difficult of execution according to the locality, and also according to the presence or absence of any inflammatory changes round the artery. In a vessel like the femoral in Hunter's canal it is usually quite easy, whereas in a locality such as that of the subclavian artery it may be exceedingly difficult to remove the sheath of the vessel from all sides. R. Leriche[1] lays great emphasis on the physiological facts that the sympathetic nerves are both afferent as well as efferent in their function, and the result of their division is partly reflex in its nature. The portion of artery which has been stripped immediately contracts, and active vasodilatation occurs, chiefly in the limb below the point operated upon, and to a less extent in the opposite limb and all over the body. These phenomena are accompanied by a local rise of temperature and a general leucocytosis; they are all transient, lasting for a few weeks, but the local distal vasodilatation may persist indefinitely.

The following conditions represent briefly the chief indications for performing the operation: (1) Pain, peripheral and visceral. (2) Vasomotor syndrome; Raynaud's disease; scleroderma. (3) Certain chronic and trophic ulcers. (4) Certain bone and joint disorders, both traumatic and infective; Volkmann's contracture. (5) Certain injuries and diseases of arteries and veins.

Painful Conditions.—Pain which is conducted through the sympathetic channels has certain definite characters which distinguish it from that which is associated with the cranial and spinal nerves. It is not confined to a fixed territory, but radiates to adjacent parts, and it is closely associated with emotional disturbances. The various types of causalgia which result from severe trauma such as gunshot wounds are especially indicated as likely to be relieved by the operation we are considering. It is important, however, to distinguish from these that type of ascending neuritis or neuralgia which begins with some trivial injury to a digit and then steadily creeps up the limb.

This last type of case usually is subject to one amputation after another, without avail. If any surgical procedure is to be tried for such a case, it should be either a ramisection or a division of the sensory tracts in the spinal cord. Painful amputation stumps are of three types. In one there is definite local tenderness on pressure caused by bulbous nerve-endings: the treatment of this type should be excision of the affected nerve-ends. In a second type pain is felt in the phantom limb; in this no local operation is of any avail, but ramisection may be indicated if treatment by psychic suggestion fails. It is the third type, characterized by paroxysmal attacks of pain associated with trophic changes such as ulceration in the skin, which may be relieved by sympathectomy. Visceral pain such as that of angina pectoris or dysmenorrhœa, or incurable cancer of the pelvic organs, lies outside the scope of the present article; but it is very interesting to note, in its bearing upon the important problem of a cure of pain, that the last-mentioned diseases may be relieved by the division of the sympathetic fibres associated with the internal iliac arteries or those which run down from the bifurcation of the aorta to the pelvis.[2]

Vasomotor Diseases. In the typical *Raynaud's disease* sympathectomy gives the most relief. These are the cases in which the parts become intensely white by vasoconstriction, prior to a blue stage which is painful. In the less typical cases the hands are always blue, the patient being able to bear the fingers in cold water, whilst hot water hurts. This type of case is not benefited by sympathectomy, but is sometimes relieved by ramisection. *Scleroderma* is a comparatively rare disease in which long-continued vasomotor disturbance produces a kind of thickening in the subcutaneous tissues. R. Leriche[3] describes four cases of this condition in which remarkable improvement followed sympathectomy.

Chronic and Trophic Ulcers.—It is probably this group of common diseases which will prove the greatest value of sympathectomy. The real causation of these ulcers in the lower third of the leg has never been fully understood, although their frequent association with circulatory disturbances, such as varicose veins, has long been recognized. If the condition has not been of too long standing, and if the patient is reasonably young and healthy, sympathectomy will often produce a lasting cure. It may be necessary or desirable also to do a skin-grafting operation, a procedure which without the nerve operation nearly always leads to disappointment.

Certain Bone and Joint Disorders.[4]—The factors which control decalcification of the articular ends of the bones are very obscure. It is well recognized that in certain infections, such as tubercle or the pyogenic organisms, the bones of the limb rapidly become decalcified. This result also follows certain injuries without any very obvious reason. In all this class of cases a division of the sympathetic fibres arrests the process of decalcification and leads to a more rapid recovery. It is probable that this result may be brought about by mere vasodilatation, but it is possible that the sympathetic nerve has some direct control on the tissue growth of the skeleton. In chronic cases of tuberculous joints in which there is no evidence of destruction of the cartilage but advanced synovial changes with much decalcified bone, it is claimed that sympathectomy will expedite recovery. It is, however, not suggested that this should be anything more than adjuvant to other methods of treatment. One is naturally reminded of the vogue which was once held by passive congestion produced by an elastic bandage. No doubt sympathectomy acts as a congestive agent, but in all probability it has a deeper and a more lasting effect than can be produced by a tourniquet. It is, however, in relation to certain traumatic conditions that sympathectomy seems to afford a very welcome new method of treatment. It is a well-known fact that sometimes a sprain of a joint leads to a condition of chronic stiffness and pain, the X rays showing marked decalcification. It is in this type of case that the operation we are considering may lead to rapid improvement.

The sympathetic nervous system has certainly a direct or indirect influence upon the repair of bones after fractures. By experiment it has been shown that division of the sympathetic nerve-fibres in a limb causes a more rapid production of callus if a bone of the limb be fractured. Similarly in the case of delayed union of a fracture, repair will be hastened by sympathectomy. It must be understood in the latter case that mechanical hindrances to union must also be removed.

Volkmann's Contracture.—This distressing condition, which usually follows as a complication of fractures of the elbow-joint, is notoriously difficult of treatment. Leriche believes that the blocking of the vessels and the failure of the collateral circulation is in part at least due to persistent vasoconstriction. He therefore, in the treatment of a recent case, exposes the brachial artery, and if this should appear normal he does a sympathectomy. Frequently, however, the artery is found to be thrombosed, and in such a condition the affected part of the artery was removed. This operation is followed by a softening and considerable recovery of the contracted muscles. One most interesting case is reported in which, prior to this operation, the case had been treated by excision of a portion of both the radius and the ulna, but the bones had failed to unite. Leriche's operation brought about union of the bones together with marked improvement in the muscle power.

Disorders of the Arteries and Veins.[5]—There are many conditions which lead to thrombosis in the arteries and veins. Some of these are traumatic and others constitutional in origin. In those conditions where there is a diffuse endarteritis obliterans affecting all the vessels any local operation is clearly useless. Leriche has shown that some of these cases depend upon an excess of secretion by the adrenal glands, and he has performed the operation of **Hemi-epinephrectomy**—that is, removal of one suprarenal gland—with benefit. In the more localized conditions of thrombosis or obliterating arteritis this author advises that the section of damaged artery or vein should be excised. He considers that the local damage to the artery has also produced a lesion or irritation of the nerve-fibres in the perivascular sheath. He relates seven cases in which this arterial excision was followed by the recovery from a condition closely threatening gangrene.

G. E. Brown and M. S. Henderson,[6] of the Mayo Clinic, have contributed a very valuable paper on this subject. We should like to comment with approval on the collaboration between a physician and surgeon in this work. The subject is one which without such team work can never be properly handled. They give a very good classification of arterial disease, distinguishing first between functional or vasomotor types and organic types of disease; the chief subdivision of the former is into vasoconstricting and vasodilatation types, either of which may be either local or general. Perhaps the most interesting of the organic type is that of thrombo-angiitis obliterans, a disease which is usually found in young male Jews. These authors consider that amputation below the knee is the line of treatment indicated when the disease affects, as it usually does, the vessels of the lower extremity. It is evident that some of their cases are those for which Leriche has successfully performed excision of the obliterated artery. The present authors, however, only refer to the possibility of curing these cases by surgical attack on the sympathetic nervous system by means of **Lumbar Ramisection.**

There can be no doubt that the surgery of the sympathetic nervous

system offers a field for very much more extended investigation, both experimental and clinical.

References.—[1]*Presse méd.* 1927, April, May, and *Lyon Chir.* 1926, Jan., Feb.; [2]*Presse méd.* 1925, April 11; [3]*Rev. de Chir.* 1927, lxv, 285, and *Gaz. des Hôp.* 1928, July 25; [4]*Presse méd.* 1928, June 20; [5]*Rev. de Chir.* 1928, 214; [6]*Jour. Bone and Joint Surg.* 1927, Oct., 613.

PERICARDITIS.

A. G. Gibson, M.D., F.R.C.P.

J. A. Capps[1] has made some interesting observations on *the nature of pericardial pain*. He finds that paracentesis of the pericardium lateral to the mammary line in the 5th and 6th interspaces gives pain in the neck similar to that due to irritation of the diaphragmatic pleura, and it is inferred that this portion of the pericardium is innervated by the phrenic nerve. Irritation of the inner surface of the pericardium during paracentesis by means of a silver wire produced no effect. 'Tripping' of the apex of the heart with the wire produced a feeling of distress and apprehension. In four cases of subacute and chronic pericarditis with large effusion, there were complaints of dyspnœa and a sense of oppression over the heart, but no pain or tenderness on deep pressure. In four cases of dry pericarditis, two had dyspnœa and one a tight feeling over the heart; the other two had no distress of any kind.

L. Ramond and R. Weill-Spire[2] describe a case of *paracentesis pericardii* in pneumococcal pericarditis, with cure. They adopted the epigastric operation as recommended by Larrie, which is simple and easily performed. An incision is made over the xiphoid process, which is resected, the peritoneum is pushed back, the diaphragm incised, the pus evacuated, and a tube inserted. The patient was a woman of 23 who had otitis media followed by thrombophlebitis of the left jugular vein. A mastoid operation was performed, after which she developed severe abdominal pain, dyspnœa, and dullness in the chest. Paracentesis of the pericardium yielded 240 c.c. of pus, with pneumococci. Two further punctures were made with no improvement. Finally a pericardiotomy was performed by Larrie's method. Drainage was maintained for fifteen days and the patient made a good recovery.

References.—[1]*Arch. of Internal Med.* 1927, Nov., 715. [2]*Bull. et Mém. Soc. méd. Hôp. de Paris*, 1927 (abstr. *Surg. Gynecol. and Obst.* 1928, Feb., 99).

PERITONITIS.

A. Rendle Short, M.D., F.R.C.S.

Treatment.—Giraud,[1] of Marseilles, contributes a critical review of the methods in use in France. He approves of **Morphia** in small doses, say two injections of $\frac{1}{6}$ gr. in the day, to allay peristalsis and so give rest to allow the bowel to recover, and prevent dissemination of infection. He also finds that the application of large **Ice-bags,** with a dry flannel between them and the skin, eases pain. The free introduction of **Saline,** either subcutaneously or per rectum, is valuable to dilute toxins. Murphy's proctoclysis is a special example of this. Recently better results have been obtained by giving hypertonic saline intravenously—e.g., 100 c.c. of 20 per cent solution, 20 c.c. at a time, repeated at 4-hourly intervals. Fowler's position is advocated. Coming to *surgical* means, removal of the cause is of course all-important. Lavage with saline is not recommended, nor is the introduction of oil or camphorated oil. Many Continental surgeons believe in flooding the peritoneum with ether, but the benefit is shadowy and the risk real. Four or five French surgeons have had deaths directly attributable to ether poisoning. Some form of suction apparatus to evacuate septic fluids from recesses of the peritoneal cavity is very useful. All raw peritoneal surfaces ought to be covered somehow, using omentum if other means fail, to avoid adhesions. Free omentum will live. **Enterostomy, Cæcostomy,** or **Lateral Anastomosis** is often of great and life-saving value, not at the time of the primary operation as a rule, but if paralytic ileus arises. **Spinal Anæsthesia** will generally secure an evacuation of the bowel, but is too risky and too transient. **Drainage** of the peritoneal cavity may be made by rubber tubes or the Mikulicz pack of gauze, so-called capillary drainage. French opinion has long been acutely divided on this subject. It is well known that rubber-tube drainage is ineffectual after forty-eight hours, but it still has a real value. The best rule seems to be, in the words of Descomps, " if there are copious stagnant fluids, drain ; if there is a bleeding non-peritonizable surface, use the Mikulicz gauze pack ; if neither, neither drain nor pack ".

Sierro,[2] recording 286 cases of peritonitis treated at Geneva, mostly following appendicitis, discusses the value of drainage by tubes. It certainly saved some lives. It was often useless in that nothing drained out. In one case it led to a stercoral fistula ; in three it may or may not have been responsible for intestinal obstruction ; and in one case, perhaps, it had something to do with causing premature confinement. It was never a cause of death, whether by eroding a vessel or otherwise. The verdict, on the whole, is favourable in certain cases, especially if there is septic material in the pouch of Douglas.

A. Schleussner[3] writes in favour of the **Ether** treatment. The quantity poured in must not exceed 100 c.c., and 40 to 60 c.c. are generally sufficient. It causes a strong wave of peristalsis. Drainage is essential after using ether.

A. Kittinger,[4] in cases of septic peritonitis, pours from 50 to 150 c.c. of **Germ-free Cultures of B. Coli and Mixed Filtrates** into the peritoneum. Of 26 cases all recovered.

H. C. Trumble,[5] of Melbourne, warmly advocates the methods of the late H. L. Barnard in dealing with *pelvic abscesses* after peritonitis. The symptoms are persistent temperature, raised pulse-rate, tenesmus and passage of mucus per rectum, some abdominal distention, and sometimes bladder irritation. The swelling can be felt per rectum or per vaginam. To prevent, pus in the pelvis should be aspirated or pipetted out at the primary operation, gauze mopping being avoided as too likely to damage epithelium. If the abscess is localized to the pelvis and abuts directly on the rectum or vagina, it should be opened by that route, but not otherwise. The best time is about ten days after the first intervention. No tube need be used.

Tuberculous Peritonitis.—M. Luginbuehl[6] considers the treatment of tuberculous peritonitis, on the strength of 120 cases, half of them operated upon and half left to the physician, at Basle. There is a definite tendency to spontaneous cure. This may best be aided by **X Rays, Quartz Lamp, Sunlight,** and **Aspiration** of ascitic fluid. Of cases treated medically 35 per cent died, and of those operated on 15 per cent. The ascitic form was much more hopeful than the fibro-adherent type. The figures must not be taken as showing that surgical intervention would in all cases be best, because many were opened in error on a diagnosis of appendicitis, and these include the earliest and most promising. No patient died of tuberculosis of the peritoneum alone. Even patients with polyserositis recovered under medical treatment in four instances. A late follow-up of 76 cases showed : 43 treated medically—22 cured (51 per cent), 7 improved (16·5 per cent) ; 33 treated surgically—16 cured (49 per cent), 12 improved (36 per cent). The average time to effect a cure was in both groups six months.

Pneumococcal Peritonitis.—H. Salzer[7] draws a distinction in the treatment of this condition according to the sex. In boys he advises operation, because the probabilities of appendicitis are so great. In girls, it is safer to wait until an encysted collection of pus is present.

REFERENCES.—[1] *Marseille méd.* 1928, June, 791 ; [2] *Lyon Chir.* 1928, March–April, 135 , [3] *Münch. med. Woch.* 1927, July 1, 1091 ; [4] *Wien. klin. Woch.* 1927, Aug. 4, 997 ; [5] *Med. Jour. of Australia*, 1927, July 2, 4 ; [6] *Beitr. z. klin. Chir.* 1927, cxl. 526 ; [7] *Deut. Zeit. f. Chir.*, 1928, Feb., 226.

PERITONITIS IN CHILDREN (Primary Streptococcal).

John Fraser, Ch.M., F.R.C.S.Ed.

Joseph Schwartz[1] discusses this question, basing his remarks on a series of 14 cases (9 female and 5 male), the total showing an incidence of 1·5 per cent in 400 consecutive cases of surgical disease in children under thirteen years of age. Dr. Schwartz confirms the fact which others have pointed out, that the disease has a seasonal incidence, occurring with remarkable constancy within the period between October and April, a time when respiratory tract infections are apt to be prevalent. The exciting cause, as isolated bacteriologically, was shown to be the *Streptococcus hæmolyticus*, but the route by which the organisms reached the peritoneal cavity was not definitely established. The chief suspicion fell upon the blood-stream, and in certain female cases upon the genital tract. In ten cases there was a preceding history of sore throat, and it was suspected that this was the point of entrance of the blood infection (this observation has been made by other observers, and particularly by Rabinowitz). No evidence was obtained to suggest that the infection passed through the intestinal wall.

The clinical picture was certainly such as to suggest a blood infection. In a considerable proportion of cases the illness was introduced by an attack of nasopharyngitis with cough and rise of temperature. A few days later abdominal symptoms made their appearance, and this phase was accompanied by considerable increase of the pyrexia ; vomiting was a constant feature, while diarrhœa was usually absent. The pulse and respiration rates showed marked increase, and in the later stages of the disease there was profound collapse. The diagnosis of acute general peritonitis is usually evident, but the recognition of the actual bacterial type must necessarily remain problematical until the effusion is displayed and examined. For this reason the author recommends that an abdominal puncture should be made " in the midline below the umbilicus and well above the bladder ".

Operation at the earliest possible moment offers the best chance of recovery, and the procedure should be limited to the simplest possible manœuvres—incision and drainage. We most fully agree with this conclusion, and we concur in the statement, " I have found no instance in which a patient with proved streptococcus peritonitis recovered without operation ".

It is remarkable that this paper contains no reference to **Intravenous Serum** treatment. It is of such undoubted value in many cases that use should be made of it in every instance.

REFERENCE.—[1]*Surg. Gynecol. and Obst.* 1927, Nov., 590.

PERNICIOUS ANÆMIA. (*See* ANÆMIA, PERNICIOUS.)

PHARMACOLOGY AND GENERAL THERAPEUTICS. *Ivor J. Davies, M.D.*

Oxygen.—II. Whitridge Davies[1] opened a discussion on the administration and therapeutic uses of oxygen at the annual meeting of the British Medical Association in 1927. Barcroft's classification of three types of oxygen lack is adopted : (1) Anoxic oxygen lack, due to alteration in the atmospheric environment or to impairment of the gaseous exchanges in the lungs, and thus the arterial blood does not contain its normal amount of oxygen ; (2) The anæmic type of oxygen lack, where, owing to deficiency or alteration of the hæmoglobin, the blood is unable to carry the oxygen which is presented to it in the pulmonary alveoli ; (3) The stagnant type of oxygen lack, where the arterial blood contains its normal amount of oxygen but, owing to local or general circulatory causes, an insufficient amount of blood reaches the tissues. These untoward effects can all be more or less completely overcome by the administration of oxygen, the amount being variable. The physiological principles of the subject are fully described in the paper. In general he said that, with the small rates of oxygen flow usually adopted, the tube and funnel and nasal catheter methods are absolutely ineffective; that the increase in alveolar oxygen percentage is so small that, apart from possible psychological effects, no benefit to the patient can possibly be attained. This probably accounts for many of the statements to the effect that oxygen administration is of little or no benefit.

The first widely adopted method of administering oxygen quantitatively was that of Haldane, which was introduced during the war and used with very marked benefit for the treatment of war gas-poisoning. The oxygen is delivered into a small bag attached to a mask, and remains in the bag during the expiratory phase of respiration. Gilchrist and Davies have devised a modification of the Haldane's apparatus by means of which it is possible to calculate the alveolar oxygen percentage.

Oxygen administration is necessary mainly in the treatment of anoxic oxygen lack, and here the ideal is to administer just sufficient oxygen to restore the oxygen saturation of the arterial blood to its normal level. This requires facilities for blood-gas estimations which are not generally available. There are, however, other and simpler criteria of adequate oxygen administration. The first criterion is the abolition of cyanosis, but the aim in the treatment of acute respiratory conditions is to prevent rather than to treat cyanosis and oxygen lack. The second criterion is the relief of dyspnœa; and the third and probably the most reliable criterion of successful oxygen administration is a fall in the pulse-rate. Barach, in assessing the value of oxygen therapy in the treatment of pneumonia, notes the diminution of restlessness, promotion of sleep, and the tendency to lessened delirium. It cannot be too strongly emphasized that the changes in the central nervous system, of which delirium is a manifestation, are the result of oxygen lack, and that they should be prevented by the early administration of oxygen.

W. T. Ritchie,[2] in the same discussion, described the indications for oxygen therapy. He stated that in the administration of oxygen a common fault is to give too little. If oxygen is required we must give ample—not less than two litres a minute. This corresponds approximately to a free, rapid bubbling of the gas through water in a wash-bottle. If oxygen is required it ought to be administered as continuously as is possible; to administer it for a few minutes every few hours, or even several times an hour, is of very little, if any, value. Haldane's apparatus is recommended as the most economical and reliable. In the treatment of circulatory failure oxygen plays a minor part. The myocardium is enfeebled and the circulation is retarded. He recommends the administration of oxygen in the later stages of circulatory failure with urgent dyspnœa. Oxygen therapy is more likely to be beneficial, lessening both cyanosis and dyspnœa, when intense dyspnœa has begun suddenly and recently, as in the early phases of auricular flutter, paroxysmal auricular fibrillation, and paroxysmal tachycardia, than when it has developed gradually and lasted for a considerable time.

It is in acute pneumonia that oxygen is most often administered and where it is often of great value. Anoxæmia is only one of many factors with which we have to reckon in pneumonia. At the extremes of life, in the destitute, the intemperate, and the obese, and especially in profoundly toxic cases such as those during the epidemic of 1918–19, oxygen therapy is usually powerless to avert a fatal issue.

J. S. Haldane,[3] from his investigations on carbon monoxide poisoning and other forms of oxygen deficiency, early recognized the dangers of anoxæmia, especially its serious effect on the central nervous system, and called attention to many associated clinical conditions in which the administration of oxygen would be beneficial and even life-saving. During the World War he developed a portable apparatus for the administration of oxygen which was efficient in the treatment of gas casualties, and also was manipulated with reasonable comfort to the patient.

W. M. Boothby and S. F. Haines[4] have treated 71 patients in the oxygen chamber at the Mayo Clinic; 39 died and 32 survived. Necropsy revealed pathological lesions in 20 that oxygen could not influence. Three of the 32 that lived were placed in the oxygen chamber as a prophylactic measure to prevent an anticipated reaction, and it happened that a severe reaction did not develop. The other 29 showed marked clinical improvement, and in 12 of these the condition and clinical course were so severe that one can conservatively ascribe their survival to the fact that they were placed in the oxygen chamber. Oxygen treatment is of value only in relieving the patient of the added load and danger of anoxæmia, and it must be continued until the cause of the anoxæmia is relieved. There is no evidence that oxygen increases the patient's resistance to infection; but it does prevent the lowering of his resistance which occurs when he becomes anoxæmic, and therefore its administration should be initiated at the very first sign of cyanosis. Their study shows that a vicious circle can be started by a mild pulmonary or bronchial infection. This leads to pulmonary congestion and œdema, which, interfering with the aeration of the blood, cause anoxæmia and cyanosis; the patient then becomes more susceptible to the spread of the infection, which results in the rapid development of extension of the pneumonic process, and this in turn completes the vicious circle by increasing the anoxæmia. We have also noted that a mild bronchial or pulmonary infection, if accompanied by cyanosis, causes a greater elevation of the temperature than the same degree of infection if cyanosis is prevented by the administration of oxygen. Oxygen administration, therefore, frequently produces a crisis-like drop in temperature, decrease in the pulse-rate, and marked clinical improvement. Several case reports were recorded, and the benefit observed from the oxygen chamber was generally good and sometimes dramatic. Stadie has shown that cyanosis of the fingernails and lips that can just be detected corresponds to approximately a 10 per cent oxygen desaturation. When cyanosis is definite the blood will be approximately 15 per cent desaturated, and when it is marked the blood will be more than 20 per cent desaturated. The clinical recognition of slight degrees of cyanosis is often aided by having the patient sit up in bed, as this exertion increases the oxygen utilization and, therefore, the venous desaturation. The determinations of the oxygen saturation of the arterial blood are, as Boothby and Haines remark, impracticable as a routine, and fortunately are not necessary for the efficient selection and treatment of patients who may need oxygen if Stadie's approximations are kept in mind.

Novasurol and Ammonium Chloride.—J. F. H. Broadbent[5] contributes a note on the treatment of three cases of hepatic ascites by novasurol and ammonium chloride. Novasurol is a double salt of sodium mercurichlorphenyl oxyacetate with diethylbarbituric acid, and contains 33·9 per cent of mercury. It is soluble in water and can be given by intravenous or intramuscular injections. It may be given in doses up to 2 c.c. intramuscularly at intervals of three to seven days. Its tolerance should first be tested by giving 0·5 c.c. intramuscularly. The drug has already been described in previous issues of the MEDICAL ANNUAL: 1927, p. 356; 1928, p. 342. Ammonium chloride is given by the mouth in divided doses up to 150 gr. in the twenty-four hours. Broadbent found that 1 c.c. of novasurol followed by 120 gr. of ammonium chloride daily was efficacious in producing marked diuresis. Novasurol alone or ammonium chloride alone does not answer so well. The treatment of ascites by repeated tappings or ordinary diuretics is admittedly unsatisfactory. The explanation of the remarkable results obtained by the administration of novasurol and ammonium chloride is not clear.

Hexylresorcinol.—V. Leonard and W. A. Feirier[6] have investigated the action of hexylresorcinol as a general antiseptic. A solution containing 30 per cent of glycerin and 70 per cent of water, in which is dissolved 1 mgrm. of crystalline hexylresorcinol per cubic centimetre, possesses a surface tension of 37 dynes per centimetre (solution S.T. 37) and represents the optimum composition of the solutions investigated, for the following reasons : (1) It is stable and non-toxic ; (2) All the major types of pathogenic micro-organisms are destroyed in less than 15 seconds on contact with this solution ; (3) Its bactericidal power is fully retained (15-second standard) in dilutions which are absolutely devoid of irritant action on the most delicate tissue surfaces ; (4) Its bactericidal power is fully retained (15-second standard) in all dilutions likely to be encountered in clinical application as well as those found in the presence of organic matter ; (5) The hexylresorcinol is held in perfect solution in all dilutions ; (6) The surface tension of the solution is very low ; (7) It is water-clear and odourless ; (8) It does not attack any of the heavy metals. The optimum dilutions of solution S.T. 37 for use in the disinfection of various tissue surfaces appears to be, within certain limits, a matter to be determined by the individual case. The solution may be used full strength on the skin, in fresh cuts and abrasions, on granulating surfaces, and in abscess cavities and sinuses. It may also be employed full strength in topical applications in the ear, nose, and throat, mouth, etc. Instillations of solution S.T. 37, diluted with either one or two parts of water depending on the case, may be employed in the urethra and bladder and for renal pelvic lavage. Diluted with two volumes of water, solution S.T. 37 may be instilled in the normal conjunctival sac. For irrigations of any tissue surface in which a considerable bulk of fluid is essential, and also as wet dressings on infected wounds and denuded surfaces, dilutions up to 1–5 may be employed.

Intravenous Therapy.—J. H. Clark[7] states that acute cardiac dilatation is an ever-present danger in intravenous injection. Intravenous therapy is not the innocuous procedure it is generally considered to be. Even simple intravenous injections of supposedly innocuous physiological sodium chloride solution or dextrose in saline solution may prove disastrous, if the cardiac condition of the patient is considered of secondary importance to the accepted intravenous therapy of his general condition. The practice has become so prevalent that intravenous injections of saline or dextrose solution are employed, almost as a routine measure, even in the presence of a failing myocardium, when the patient's general condition appears to be failing or he is in need of fluid which cannot be taken by mouth. The bad and possibly fatal effect of the extra load thrown rapidly on the heart is lost sight of in the attempt to give the patient the required fluid or antiketogenic substance. Four case histories are given to illustrate the necessity of carefully choosing patients for the intravenous administration of drugs, particularly when large amounts of fluid are to be given. If the injection is given slowly and a careful watch is kept of the pulse and cardiac condition, by frequent blood-pressure determinations made during the injection, such fatalities should be preventable.

W. D. M. Lloyd[8] writes on the dangers of intravenous **Calcium** therapy. Calcium has been given intravenously in the treatment of lead poisoning, infantile tetany, tuberculosis, Bright's disease, hæmorrhage, heart disease, and in the pre-operative preparation of jaundiced patients. Cushny (1924) stated that calcium injected directly into the blood-stream acted much like digitalis in that it accelerated and strengthened the heart-beat in small doses, but in large doses it seemed to be poisonous, tending to bring the heart to a standstill.

Lloyd as a result of his observations concludes that the intravenous use of 4 c.c. of a 10 per cent solution of calcium chloride is dangerous. An electrocardiogram shows what he believed to be a sino-auricular heart-block.

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PHARYNX, LARYNX, AND TONGUE, CARCINOMA OF: TREATMENT BY DEEP X RAYS AND RADIUM.

A. J. M. Wright, M.B., F.R.C.S.

W. L. Watt,[1] in considering the use of deep X-ray therapy for malignant disease of the mouth and upper respiratory tract, emphasizes the special difficulties and dangers associated with treatment in these regions. Over-dosage is a great danger, owing to the insufficient covering of body fluids and to the presence of large air cavities which prevent the proper diffusion of rays. Attempts are being made artificially to increase this diffusion by the concentration of glucose in the blood or the permeation of the growth by metals in minute subdivision. The main advantages of deep X-ray therapy are the ease with which wide areas can be treated and the flexibility of the method. Surgery is always advisable, when possible, as an adjunct. Diathermy can be followed within three days by radiation. In doubtful cases, partial radiation immediately before operation is advisable, to be completed within ten days after operation. The radiation acts in part by destroying or injuring the cells, but probably to a greater degree by the formation of antibodies as the result of absorption of the destroyed cells. The same dosage is administered in all malignant conditions, and, in after-treatment, fresh air and feeding up are most important.

N. S. Finzi[2] states that radium can be used either as an external application in plaques or by the embedding of radium or its emanation. The former method has the disadvantage of requiring a large amount of radium, and wherever possible the latter method is to be preferred as giving, at any rate, as good results. At first large quantities of radium were buried in the centre of the tumour, but very much improved results are now obtained by the burying of radium or its emanation in small doses around the growth. The use of radium needles buried in this way gives results which are possibly better than any given by surgery. The use of small doses over a long period is rapidly gaining favour.

Choice of Method.—Lymphosarcoma, if treated early, gives as good results with X rays as with radium. Endothelioma, on the other hand, responds better to radium than to X rays. For epitheliomata radium is to be preferred, and, speaking generally, the more rapid the progress of the growth the more readily does it respond. The site of the growth is of great importance, it being easy to apply radium needles to the tongue but difficult or impossible in the epiglottis or hypopharynx. Secondary glands usually prove more resistant than the primary growth.

The dangers of radiation treatment are either immediate or remote. Œdema of the larynx may occur with either X rays or radium, and tracheotomy is usually advisable. Asepsis should be very thorough, as radium in large dosage, by its devitalizing effect on the tissues, tends to promote infection. As a remote complication, a board-like thickening of the skin, particularly after X-ray treatment, may occur. This area is then very liable to intractable infection and ulceration.

Relations of Radiation Treatment to Surgery.—For laryngeal carcinoma, radium will probably soon replace surgery. For intrinsic growths and those at the back of the tongue or epiglottis, surgery is at present preferable. For carcinoma of the mouth, palate, and tonsils, diathermy, with subsequent radium applications, or perhaps radium alone, are preferable. For growths of the upper jaw, the main mass should be destroyed with diathermy, and the resulting cavity treated with radium. When there is a choice of method, the more embryonic the type of cell the more suitable is the case for radium or X rays; the more specialized the cell, the more suitable for surgery.

Lymphosarcoma reacts extremely well to radium; if a fragment is to be removed for section, a preliminary radiation should be employed to prevent dissemination. Other forms of sarcoma vary, mixed-celled growths being resistant, while spindle-celled usually respond well to radiation. The improvement in these cases may be much delayed.

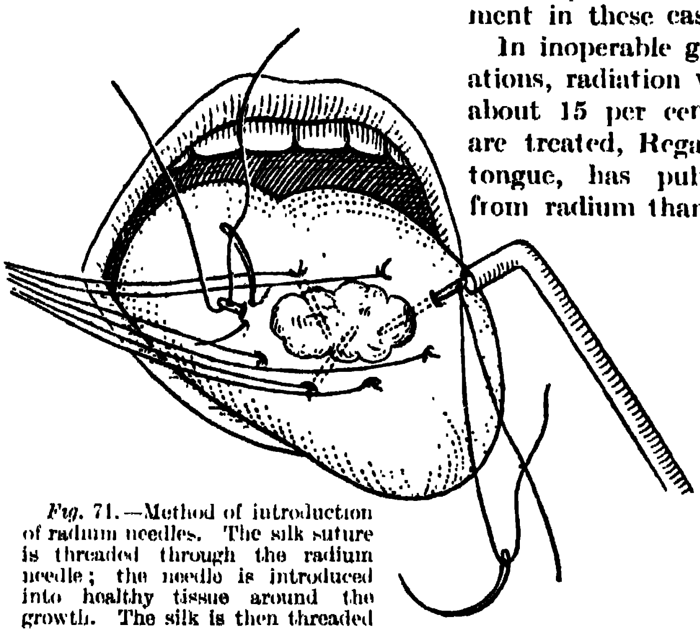


Fig. 71.—Method of introduction of radium needles. The silk suture is threaded through the radium needle; the needle is introduced into healthy tissue around the growth. The silk is then threaded through an ordinary needle and stitched so as to keep the radium in position. (*Re-drawn from the 'Proceedings of the Royal Society of Medicine'.*)

In inoperable growths in favourable situations, radiation will give apparent cure in about 15 per cent. Where operable cases are treated, Regaud, in epithelioma of the tongue, has published far better results from radium than can be obtained by surgical removal. S. Cade[3] states that in regard to malignant disease of the mouth and pharynx, lesions of the roof and back of the mouth respond better to radiation than those on the floor. In the tongue, the most favourable situation is the anterolateral aspect, the least favourable involving the floor of the mouth. The papillomatous variety, surgically the most malignant, responds well to radium. Cases with œdema of the surrounding tissues do not respond well.

Technique.—The mouth must be very clean, and usually edentulous. The primary lesion should be treated first and the glands later. Needles of 0·6 mgrm., screened with 0·5 mm. of platinum, are inserted into the healthy tissue around the growth (*Fig.* 71). Lead should be used to screen the jaw, to prevent necrosis. The glands should be radiated about four weeks later with a radium collar, the radium being at a distance of 1½ to 3 cm. from the skin. *Plate XXXVII* shows the disappearance of a nodular epithelioma of the palate after radium treatment.

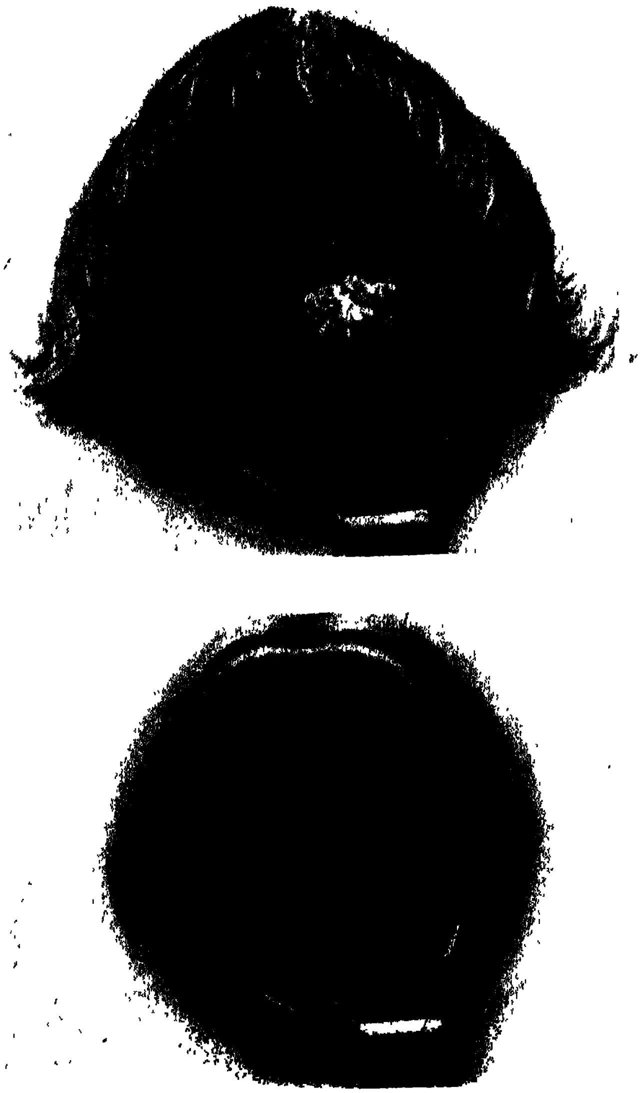
G. A. Robinson[4] claims good results from radium with fibroma of the nasopharynx. A 0·5-mgrm. tube is first applied to the pedicle of the growth for six hours to decrease the blood-supply. After two or three weeks, radon seeds are inserted into the tumour. Of eight cases treated with radium, two were successfully operated on after two radium applications, five are clinically cured with radium alone, and one is still under treatment.

REFERENCES.—[1]*Proc. Roy. Soc. Med.* 1928, Feb., 649; [2]*Ibid.* 652; [3]*Ibid.*; [4]*Jour. Amer. Med. Assoc.* 1927, ii, 751.

PLATE XXXVII

RADIUM TREATMENT OF CARCINOMA OF SOFT PALATE

(S. CADE)



The upper figure shows the case before treatment: the lower, five weeks after treatment. The total dose was 734·1 mgrm.-hours, in ten days.

By kind permission of Mr. S. Cade, and of the Royal Society of Medicine

PHOTOTHERAPY.

Albert Eidinow, M.B., B.S.

The study of the biological action of light has proved that all living tissues are directly or indirectly dependent upon the ultra-violet energy of the sun for normal growth and development. Our knowledge of the value of these rays has led to the progressive development of actinotherapy, which has now attained as great importance in modern medicine as X-ray and radium therapy. Although the study of the physiology of plants has proved that the process of photosynthesis utilizes 1 per cent of the solar radiation in the manufacture of food which is essential to the life activities of the plant, it is only in recent years that physiologists have realized the significance of light in relation to the normal and pathological processes of the body. Although the pioneer work of Finsen and the successful results of Rollier, Gauvain, and Pugh have established the value of actinotherapy, the importance of light therapy was only finally established when it was proved by X-ray photographs and chemical analysis of the blood that a nutritional disturbance - rickets—was caused by a lack of ultra-violet rays, and could be cured by the use of these rays.

In 1919, Huldschinsky successfully cured rickets with irradiation from mercury vapour lamps. His results were fully confirmed by Hess and other workers. Recently Henderson and Hume claimed that ultra-violet irradiation of air protected rats against rickets—this led to further study of the effects of ultra-violet irradiation. Webster could not confirm the experiments of Henderson and Hume, but all experiments showed that direct irradiation of animals protected against rickets. Steinbock showed that foodstuffs were made antirachitic by exposure to ultra-violet rays. Independent experiments by Goldblatt and by Steinbock showed that the irradiation of liver and muscle gave these tissues antirachitic properties. The antirachitic factor was in this way traced to the activity of the fats and sterols. Further research which was made independently in America by Hess, Weinstock, and Hilman, and by Steinbock and by Block, and in this country by Rosenheim, showed that the antirachitic agent was apparently a sterol—namely, cholesterol. Rosenheim and Webster, working at the National Institute for Medical Research, Hampstead, have finally proved that vitamin D—which is necessary for bone-building and preventing rickets in children—is formed by the action of ultra-violet rays on ergosterol. This chemical substance, which is present in cod-liver oil and also in the superficial layers of the skin, is exceedingly potent. A daily dose of $\frac{1}{85,000}$ mgrm. of ergosterol irradiated with ultra-violet rays protects young experimental rats against rickets, when fed upon a diet deficient in vitamin D. The ultra-violet rays which have the power to activate ergosterol are limited to the region of 3200 to 2500 A.U., and excessive radiation destroys the antirachitic properties. For young children a daily dose of 1 mgrm. has been said to prevent and cure rickets as successfully as the older methods of the irradiation of the skin. This great scientific discovery indicates how sunlight and ultra-violet rays control vital metabolic processes.

The beneficial clinical results which have been obtained by the exposure of the skin to the sun's rays and to open air has led to exhaustive research on the effects of radiation and to actinotherapy. The use of such phrases as 'sun-ray treatment' and 'artificial sunlight' creates an erroneous popular belief that all artificial sources of light are identical with the sun's rays and skyshine. Solar radiation received on the earth's surface consists of a continuous number of rays from 2·5 $\mu\mu$ to 0·29 $\mu\mu$. The spectral energy curve shows maximum intensity at 0·47 $\mu\mu$, and decreases to zero in the limits of the infra-red and ultra-violet rays transmitted, and at the Frauenhofer lines, where the earth's atmosphere exercises selective absorption. The intensity of the components of solar radiation varies considerably with altitude and also at a given plane—the composition of light varies from minute to minute. The gases, dust, and water vapour which are present in the lower layers of the atmosphere absorb and refract the short ultra-violet rays. Artificial sources of light differ from the sun's rays. The spectrographic and photo-electrical methods of examination show that each source of light emits a characteristic band spectrum of constant intensity. Although many of the rays transmitted are similar in character to sunlight, they differ in intensity. The therapeutic value of many artificial sources of light is due to ultra-violet rays of 3000 2500 A.U., which are entirely absent in solar radiation. Although irradiation may result in similar biological reaction, Professor Hill maintains that the high intensity of the sun's rays between 3300 and 2990 A.U. gives a slow biological action compared to the rapid effects of the short rays between 2970 and 2500 A.U. emitted by artificial sources of light. Rosenheim and Webster have shown that the activation of ergosterol to vitamin D needed exposure for one month to the sun during the early spring months, compared to one hour's exposure to a mercury vapour lamp. In many early experiments the effect of heat rays has not been sufficiently controlled.

The biological action of light is primarily due to photochemical reaction. Waves of light are absorbed by living cells and produce photo-biochemical reactions which influence the whole organism. All living cells are sensitive to ultra-violet rays from 3100 to 2500 A.U.; furthermore, the living cells can be made sensitive to infra-red, visible, and long ultra-violet rays by the addition of certain dyes and chemical substances called 'light sensitisors'. When a normal tissue, such as the skin, is exposed to a source of light emitting numerous waves of light, each group of waves penetrates through the depths of the tissue to varying degrees and has a different biological action. The near infra-red, visible red, yellow, green, and blue visible rays penetrate to the blood-vessels and heat the tissues. Excessive exposure to these rays, and failure to control the normal temperature balance, gives rise to heat stroke, light stroke, and those dangers which menace the adaptation of the white races to tropical climates. The long ultra-violet rays excite a greenish fluorescence of the skin and are selective in their behaviour to the light sensitisors. The ultra-violet rays from 3100 to 2500 A.U. penetrate to the superficial layers of the living epidermal cells. They excite a green fluorescent light in the horny layers of the skin, and have a rapid lethal action on the living cells, producing a characteristic erythema of the skin at the site of irradiation. Recently it has been shown that rays of 9 to 7 A.U., near the region of X rays, give biological reactions similar to ultra-violet rays.

Our present conception of the therapeutic value of light is mainly based upon the action of ultra-violet rays. All methods of phototherapy must depend upon the quantity and quality of these radiations present in any given source of light. The sun and blue skyshine are sources of natural light, while many types of carbon arcs and mercury vapour lamps have been manufactured for treatment of diseases by means of 'artificial light' or ultra-violet 'sunray' therapy.

There are five methods of measurement of the nature of the rays emitted by a source of light: (1) Spectro-photographic; (2) Photo-electric cell method; (3) Thermo-electric; (4) Chemical; (5) Biological. The spectroscope gives a photographic record and an analysis of the waves of light emitted by a source of light. Photo-electric cells show a change in electrical charge with irradiation; each type of cell contains a metal—cadmium, sodium, selenium, etc.—which is sensitive to a definite region of the spectrum; the change in electrical charge can be measured by means of a gold-leaf electroscope or a sensitive galvanometer. The thermo-electric method determines the intensity of radiation by the effects of light on a blackened thermopile attached to a galvanometer. Numerous chemical methods, such as the darkening of lithopone paint, the Levy-West pastille, the acetone, and the methylene-blue gauge, have been employed. The lethal action of light on bacteria and protozoa, and the production of erythema of the skin, are the most practical methods.

The nature of the reaction produced with ultra-violet irradiation of the skin depends upon (1) the sensitiveness of the skin, (2) the distance from the source of irradiation, (3) the intensity of rays from 2970 to 2500 A.U. emitted by the source of light, (4) the temperature, (5) the length of time of exposure. The reactions of the skin which follow skin irradiation are variable, but can be classified as: (1) Subminimal dose—without erythema; (2) Minimal erythema dose—producing erythema at the line of demarcation between the irradiated and the non-irradiated areas; (3) Maximal erythema dose—producing a definite erythema over the whole area irradiated; (4) Blistering or exudative dose.

Some days following irradiation, desquamation and pigmentation are evident with doses of light greater than the subminimal erythema dose. The period of time for the development of these clinical changes varies with the nature of the source of light and the sensitiveness of the skin. It has been suggested that the erythema is due to the abiotic action of ultra-violet rays, and that the damaged superficial epithelial cells activate 'necro-hormones' which finally produce typical reactions to light. Experiments with extracts of tissue, including skin extracts, do not confirm this theory. It has been shown that the damage of many of the tissues liberates a substance which has been isolated and recognized as histamine. But the reaction of the skin to light and the changes produced in the skin by histamine are not identical. It is difficult to explain the latent period preceding the production of erythema and the localized reaction which is obtained with ultra-violet rays. The common irritants and blistering agents produce widespread reaction of the skin, irregular in nature, but which correspond to the distribution of the posterior nerve-root area supply of the skin.

Further experiments on irradiation have shown that the erythema of the skin is only obtained when there is normal capillary circulation. In the region of scar tissue, in conditions of ischæmia or of obliteration of the capillaries by artificial methods such as freezing or the use of adrenalin, irradiation of the skin modifies the reaction and the production of erythema. It is difficult to explain the difference in the sensitiveness of the skin of the child up to 2 years of age. Rollier's theory that the pigment of the skin, melanin, acts as a photodynamic substance cannot be maintained. The normal white skin is sensitive to ultra-violet rays from 2970 to 2500 A.U., and this sensitiveness is comparable to the effect of the visible rays on the photographic light-sensitive plate. There is, in all probability, some photo-biochemical effect produced which controls these reactions, which are typically characteristic of light erythema.

The evidence described by Rosenheim and Webster has proved the activation of ergosterol by ultra-violet rays, and the product obtained is in all probability vitamin D. This may indicate the nature of the photochemical mechanism of irradiation. The action of ultra-violet rays on the fats and sterols in the superficial layers of the skin can explain the definite protection against rickets which has been successfully obtained by exposure of the human child's skin to sunlight and artificial sources of radiation. It must be realized that up to the present time there is no evidence to correlate this action of rays on the sterols and the erythema reaction of light. Experiments on the effect of light on the skin extracts tested *in vitro* and *in vivo* have so far completely failed to reveal evidence of the production of any photochemical substances.

Histological examination of the changes in the skin following irradiation indicates alteration in the epidermis and the capillary circulation. The partial destruction of epidermal cells in the stratum corneum has been described by Gassul and other observers. Intensive irradiation produces blistering and necrosis of the skin. The erythema dose of light demonstrates marked changes in the capillary circulation. One hour after irradiation of the skin there is evidence of marked dilatation of the capillaries, which are engorged with blood cells. This is followed later by the exudation of plasma and production of a fibrinous exudate in the interdermal tissue and extending to the subcutaneous tissue. The polymorphonuclear cells aggregate in the capillaries and lie in proximity to the endothelial lining of the lumen; the endothelial cells are swollen and enlarged. Diapedesis of the polymorphonuclear cells can be readily observed—these cells wander into the interdermal layers of cells, and finally aggregate as a dense infiltration of white cells amidst the whole structure of the skin. These observations conclusively prove that the erythema dose of light produces a marked local hyperæmia and excites a local white-cell infiltration of the epidermal tissues. The action of light appears to cause a profound effect upon the endothelial cells, and the transudation of fluids through the walls of the capillaries. The extensive exudation of plasma gives rise to the intradermal œdema of the tissues which is so characteristic in the irradiated skin. The effect of ultra-violet irradiation of the skin is similar (but to a much milder extent) to the histological changes seen in the skin of animals sensitized with photodynamic substances and exposed to visible rays. The changes in the capillaries and the blocking of the lumen with white cells have been described in detail by Campbell and Hill. The damage which is produced may be sufficiently intense to cause death by intravascular thrombi and embolic infarction of blood-vessels in the vicinity of vital organs. The extensive necrosis of the skin and subsequent gangrene which has been observed can be attributed to circulatory disturbances. This may cause death by secondary infection and septicæmia.

The study of the effect of ultra-violet irradiation of the skin on the bactericidal properties of shed defibrinated blood tested *in vitro* has proved that the minimal erythema dose of light increases the bactericidal power of the blood. The maximum effect is obtained by irradiation of about 20 to 30 sq. cm. of skin per kilo. of body-weight. It has been shown that this bactericidal action originates locally at the site of irradiation and is carried by the blood-stream into the general circulation. So far it has not been possible to isolate a bactericidal substance from extracts of irradiated tissue—i.e., the skin—but the difficulty in the preparation of a suitable skin extract has impeded this research. The bactericidal response of the blood following ultra-violet irradiation may be due to the action of light on the skin or the blood-capillaries—the endothelial cells or some other factor. The fact that increase in the bactericidal power of the blood follows ultra-violet irradiation of the peritoneum, the abdominal viscera, and the subcutaneous tissue may support the theory that the irradiated endothelial cells are responsible for this bactericidal action of light. But the penetration of ultra-violet rays is slight, and the greatest absorption occurs in the superficial skin cells. The primary effect may originate in the superficial layers of the skin where the rays are absorbed in the region of the young growing epidermal cells. The substance which is formed may have effect on the endothelial lining of the blood-capillaries, and in this way produce the characteristic changes associated with erythema. Whether the effect of ultra-violet rays is due to direct action on living cells or whether it is due to irradiation of a chemical substance is a problem for future speculation. The 'blister fluid' obtained by massive irradiation has no bactericidal properties, and its bactericidal power is identical with that of serum. The results of my experiments suggest that it is a phenomenon only produced in the living animal.

The hyperæmia of the skin which is produced by infra-red rays and luminous rays is due to the dilatation of the blood-vessels. Associated with ultra-violet rays a rapid and intensive erythema is observed following irradiation. A similar type of reaction has been described by many observers who have irradiated the skin with ultra-violet rays and then directly afterwards exposed the irradiated area to infra-red rays. The effect of this reaction is less painful and irritating than the normal response, and does not have such lasting effects. This is due to the screening effect of the blood in the dilated and engorged blood-capillaries, which restricts the action of the ultra-violet rays on the more superficial layers of the skin. Cooling the skin and the use of compression causes a deeper and more intense reaction owing to the greater depth of penetration of the skin-sensitive rays.

The local effect of ultra-violet rays increases the immunity of the skin and promotes a local bactericidal response. This may explain the beneficial action of the local irradiation of lupus lesions. The increased leucocytic infiltration of the skin, or the production of a direct photo-biochemical agent with irradiation, may develop a highly bactericidal and immune skin. Our knowledge of tissue immunity is limited; but although there is evidence to support this theory that the irradiated skin has a greater local resistance to microbic and viricidal infections, excessive dosage with light, producing marked erythema, blistering, and necrosis of the skin, will create an excellent culture medium for bacteria, and in this way aggravate and excite the spread of infection. The present confusion in the technique of treatment with sources of irradiation is due to the failure to recognize the difference between the reactions due to ultra-violet rays and the reactions due to visible and heat rays. The former depend upon the action of rays on the surface layers of the skin and are photo-biochemical agents. The latter are due to heating effects, and are similar to the other methods of radiant heat therapy, producing (1) dilatation of blood-capillaries, (2) acceleration of blood-flow, (3) sweating. Except under exceptional circumstances, when special photosensitive substances are present, there is no similarity in action; but as the frequency of the rays of light increases, the biological action of visible rays gradually merges into the phenomena associated with ultra-violet irradiation.

The present conception of the action of ultra-violet rays on the skin supports the theory of the production of (1) local photo-biochemical substances which have bactericidal or vitamin properties, (2) local hyperæmia of the skin, (3) stimulation of a leucocytic infiltration of the epidermal tissues. The results of these experiments have suggested that the erythema dose of light produced by ultra-violet rays within the limits of 3100–2500 A.U. has beneficial therapeutic action. The technique of ultra-violet therapy should be based upon this principle. The results of this technique of general treatment have been successful in the treatment of acute and subacute bacterial diseases.

The Finsen Light Institute at Copenhagen has developed the use of the short-flame carbon arc. In their technique of treatment, carbon arcs utilizing 60 to 70 amperes and 50 volts across the electrodes are employed as a source of light. The rays emitted by this source of light are mostly long ultra-violet rays and visible and heat rays. The whole surface of the body is exposed to light for twenty minutes to two hours twice or three times a week. Although excellent clinical results have been obtained, the experimental evidence gained from the observations of the immunity of the skin following irradiation, and the study of the hæmobactericidal response to light, suggest that overdosage and excessive exposure have been utilized. This technique is useful for irradiation with lamps emitting ultra-violet rays longer than 2970 A.U., but the danger of over-exposure is prevalent if this technique is applied to lamps emitting rays shorter than 2970 A.U.

The study of the effect which ultra-violet radiation of the skin has on the bactericidal power of the blood has shown that a maximal increase in hæmobactericidal power is obtained (1) with a minimal erythema dose of light, (2) when a surface area of skin corresponding to one-sixth of the surface area of the body is irradiated.

The application of an erythema dose of rays renders the irradiated area immune to further reaction for three or four days; this is due, not to pigment, but to the protective action of the exudates in the inter-epidermal tissues. During the stages prior to desquamation the skin is still immune to radiation, since the dead epidermal cells screen off the biological rays. During desquamation, the exposed epidermal tissue is hypersensitive to light and an irregular reaction results, demonstrating immune and hypersensitive areas. From these observations it seems right that a period of ten to fourteen days should elapse between the exposures of any given areas of skin. In this way the skin is kept sensitive to rays, and over-exposure is avoided. Excessive exposure to radiations, with or without pigmentation, renders the skin immune to the erythema reaction of short ultra-violet rays of 2970–2500 A.U. These observations have led to a special technique of treatment with lamps such as quartz mercury lamps and long-flame metal-cored arcs emitting shorter rays than 2970 A.U. This is called 'short-ray' therapy.

The principles of 'short-ray' therapy can be summarized as follows: (1) Exposure of an area of skin roughly equal to one-sixth of the surface area of the body; (2) An interval of ten to fourteen days between irradiations of any given area of skin; (3) Irradiation conducted two to three times a week; (4) The application of the minimal erythema dose. In the treatment of acute pyæmia the minimal erythema dose applied by daily exposure of a smaller area of skin, equal to one-twelfth of the surface area of the body, has proved beneficial.

Although ultra-violet radiation of the skin or general treatment may heal many types of chronic inflammatory lesions, the prudent use of local irradiation accelerates repair. As a general routine, local treatment should not be applied until the beneficial effects with general irradiation have been obtained. The local reaction produced is usually severe, and faulty technique often aggravates the disease. For the treatment of lupus, the Finsen-Reyn arc lamp, the water-cooled arc lamp, or the mercury vapour lamp may be used. The correct preparation of the skin before applying local treatment and measures to remove all dead epithelium and scales should be adopted. A full erythema dose or blistering dose should be applied, and a full period of two to three weeks allowed to elapse before repeating treatment of any given lesion. In some cases the use of photodynamic sensitizers is helpful. The blue-uviol screen transmitting 4500–2800 A.U. is useful for local treatment of the eye. The small water-cooled mercury lamp or throat lamp is invaluable for treatment of the nasopharynx, palate, and larynx. The success of local irradiation depends upon the careful clinical observations of the local and general reactions following treatment.

The irradiation *in vitro* of isolated tissues and tissue-cell emulsion has failed to produce any bactericidal substance. Blood-cells exposed to sources of ultra-violet rays undergo marked changes: hæmolysis occurs to a varying degree, methæmoglobin is formed, the leucocytes are destroyed and show changes in staining reactions, and the cells are swollen and granular. This irradiated blood has no bactericidal properties, but if injected intravenously, a marked increase in the hæmobactericidal power results. Extensive irradiation (16 to 20 hours) produces complete hæmolysis of the blood, and is toxic when large doses are injected by the intravenous route. Animals get attacks of convulsions and die soon after injection, post-mortem examination showing intravascular clotting of the blood in the large veins. The results of experiments which were carried out with intensive irradiation of the blood indicate the formation of a toxic substance which is a powerful endothelial poison. Intravenous injections of irradiated blood have been utilized as a means of increasing the hæmobactericidal power.

The direct bactericidal action of ultra-violet rays indicates that the rays which are associated with skin erythema are powerful bactericidal agents. Bacteria and filter-passing viruses can be readily killed when suspended in saline; in the presence of serum the bactericidal action is greatly delayed. Tubercle bacilli suspended in saline are destroyed after exposure to the mercury vapour lamp; the same culture of bacilli mixed with blood serum and exposed in a similar way are not destroyed even after prolonged irradiation. This fact confirms the statements that the local irradiation of the skin cannot produce direct bactericidal action; the cure of microbic superficial lesions—such as lupus—is obtained by the production of hyperæmia and a local bactericidal substance in the tissues irradiated. The irradiated skin is more resistant to bacterial infection—provided that excessive exposure is avoided. There is no evidence to support the theory that bacteria and filter-passing viruses, when destroyed by ultra-violet rays, can immunize against further infection. The properties of irradiated bacteria to form suitable antigens apparently depends upon the degree of irradiation.

The transmission of the Jensen rat sarcoma is arrested by irradiation of the minced tumours with ultra-violet rays. The injection of irradiated minced tumours fails to develop a tumour in rats, and in some cases the animals treated with irradiated tumours fail to respond to further injection of extracts of normal rat sarcoma. Direct ultra-violet irradiation of the skin does not develop any local immunity to the growth of Jensen rat sarcoma.

It is to be remembered that these short rays are only emitted by artificial sources of light, and are absent in the sun's spectrum. The long ultra-violet rays from 4200 to 3000 A.U. no doubt also have marked biological action, but so far experimental research has revealed very little which is conclusive evidence. The sun and scattered light from the blue sky is by far the richest source in this region of the spectrum—the high intensity of rays present may give results which are similar to short ultra-violet rays emitted by artificial sources. But some definite experimental evidence is needed to elucidate further the biological action of the rays from 4200 to 3000 A.U.

The greater part of the evidence provided by experimental research has been obtained by the use of arc lamps or mercury vapour lamps which emit short ultra-violet rays. The use of selected filters which cut off rays and reduce intensity in the region of wave-lengths shorter than 2800 A.U. greatly restricts and delays biological action. The behaviour of the radiations of the sun is very distinct owing to the high intensity of visible and long ultra-violet rays present. The value of the therapeutic action of light was learnt by clinical observations on the effect of exposure to the sun and open air; much of modern actinotherapy depends upon the artificial sources of light emitting short ultra-violet rays which are distinct and separate from the sun's spectrum. The sun's rays have therapeutic value, but it must be realized that artificial sources of light are not identical with nature's light spectrum. The increasing popularity of irradiation of the skin has led to the widespread use of lamps. Only the rays which correspond to sunlight—i.e., 7620 to 2970 A.U.—should be utilized for these purposes. This can be obtained by the use of vitreosil or other selected screens. The principles of correct technique and careful supervision of dosage are most important.

PITUITARY, THE.

W. Langdon Brown, M.D., F.R.C.P.

It now seems clearly established by the researches of Kamm and others[1] that the posterior lobe of the pituitary gland contains two separate active principles: (1) *Oxytocin* (alpha-hypophamine), which stimulates contraction of uterine muscle; (2) *Vaso-pressin* (beta-hypophamine), which raises blood-pressure. Their isolation in the form of white, stable, water-soluble powders has been accomplished by the employment of salting-out methods and repeated fractional precipitation. They are both basic substances, presumably amines, with a molecular weight of about 600, and therefore much simpler than proteins, though more complex than ordinary amino-acids. It can be shown that the chemical processes involved do not alter the original active principle or principles, since they can be recombined to form a pituitary extract identical with the original from which they were prepared. As they are much more potent than the International Standard powdered preparation they should be used with caution; each c.c. contains 10 units, and no ill effects have been noted after injecting 0·25 c.c. With 0·5 c.c., however, abdominal cramps, nausea, vomiting, and diarrhœa were observed in one patient five minutes after injection. It may prove that one or other of these active principles is more useful in asthma than pituitrin has been; it is certain (S. L. Gargle, D. R. Gilligan, and H. L. Blumgart[2]) that vaso-pressin is the effective principle in the control of diabetes insipidus, oxytocin having but a slight effect on this condition. Intranasal administration of vaso-pressin proved more efficacious than the subcutaneous method. (*See also* LABOUR.)

W. M. Yater[3] finds that acromegaly is complicated by diabetes, or at least glycosuria, in 10 to 12 per cent of cases, though this happens much less commonly in other diseases of the pituitary. C. F. Ulrich[4] finds that, owing to the antagonism between pituitrin and insulin, the glycosuria of acromegaly responds much less to insulin than does that of pancreatic diabetes.

E. F. Adolph and G. Ericson[5] conclude that pituitary extract renders the kidneys insensitive to an excess of water in the blood plasma. This is somewhat similar to the conclusion expressed by the reviewer a few years ago, namely, that the effect of pituitrin is a direct one on the threshold of the kidney.

C. W. Bellerby[6] adds to the list of interesting reactions between the pituitary and the ovary the observation that the anterior lobe of the pituitary secretes two distinct substances affecting the ovary, one (destroyed by alkalis) which produces œstrus in immature animals, the other (stable to alkalis) which inhibits the normal cycle of mature animals.

Pituitrin in Labour.—J. I. Hofbauer and J. K. Hoerner[7] advise the nasal route for the administration of pituitrin in labour, for during pregnancy the nasal mucous membrane is highly vascular and absorbs it easily. They give 20 min. on a cotton-wool plug, followed an hour later by a second similar dose in the other nostril, the first plug being withdrawn. W. A. Scott[8] advocates Watson's method of giving pituitrin for the induction of labour after castor oil and quinine, but in smaller doses.

REFERENCES.—[1]*Jour. Amer. Chem. Soc.* 1928, Feb.; [2]*New England Jour. Med.* 1928, March 15, 169; [3]*Arch. of Internal Med.* 1928, June, 883; [4]*Ibid.* 875; [5]*Amer. Jour. Physiol.* 1927, Jan., 377; [6]*Lancet,* 1928, i, 1165; [7]*Amer. Jour. Obst. and Gynecol.* 1927, Aug., 137; [8]*Ibid.* 1926, Oct., 571.

PITYRIASIS. (*See* DERMATITIS SEBORRHŒICA; ECZEMA; SKIN, STREPTOCOCCAL INFECTIONS OF.)

PLAGUE.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

Further details of his work on the relative efficiency of *Xenopsylla cheopis* and *X. astia* in the transmission of plague has been recorded by A. N. Goyle,[1] which shows that in 52 experiments with each the former gave positive results in 25 and the latter in only 9 instances, thus confirming Hirst's contention. Moreover, at a temperature of 68° F. transmission by *X. astia* is checked by a saturation deficiency of 0·3 of an inch, but that by *X. cheopis* is only stopped by one of 0·6, while *X. cheopis* female fleas live longer apart from their host than *X. astia*, so the former is in every way a better carrier. It is therefore concluded that flea-species is an important factor influencing plague prevalence, and that the presence of *X. astia* only over large tracts of country may possibly account for its immunity to plague. P. J. Barraud[2] records a note on fleas collected in Assam, which is remarkably free from plague; in the plains, 152 of 153 were *X. cheopis* and only 1 *X. astia*, and the average number per rat was 9. G. C. Jolly[3] describes and figures a simple rat-trap made of bamboo and string by the natives of the Burma Shan States. Marcel Leger[4] writes on unresolved plague problems, and he asks whether plague is solely a disease of rats and secondarily of man, if it is always maintained in any country as an epizootic, and if the plague bacillus may not sometimes be of little virulence. He thinks further research is required on these points.

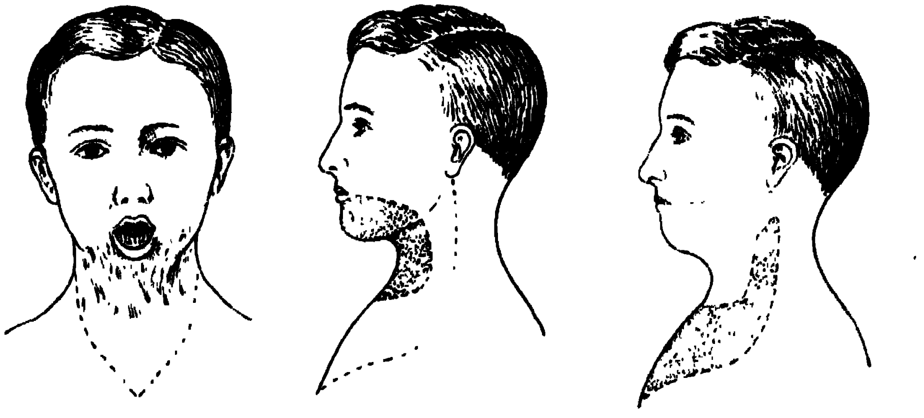
Treatment with **Antiplague Serum** intravenously is discussed by A. S. Dawson,[5] who advocates 20 to 60 c.c. subcutaneously after a preliminary intravenous injection of 30 to 40 c.c., and he states that 16 of 50 moribund patients recovered. **Adrenalin** with **Digitalis** is always indicated as a cardiac tonic.

REFERENCES.—[1]*Ind. Jour. Med. Research*, 1927, Oct., 837; [2]*Ibid.* Oct., 519; [3]*Ind. Med. Gaz.* 1928, June, 303; [4]*Marseille-méd.* 1927, Dec. 5, 764; [5]*Ind. Med. Gaz.* 1927, Dec., 691.

PLASTIC SURGERY.

Sir W. I. de C. Wheeler, F.R.C.S.I.

Plastic Operations upon the Neck, Chin, and Lip.—L. Freeman[1] describes how in suitable cases a comparatively satisfactory chin, lip, and neck may be obtained by a single flap from the chest. The raw surface resulting from the lifting of the flap can generally be covered by extensively undermining the adjacent skin, downward on the chest, outward toward the shoulders and axillæ, and upward around the sides of the neck. Stay-sutures passing through



Figs. 72–74.—Showing the use of vizor flaps from the chest in plastic operations upon the neck, chin, and lip. (*Re-drawn from* '*Annals of Surgery*'.)

large buttons or lead plates are of service. The plan of the operation is shown well in *Figs.* 72–74.

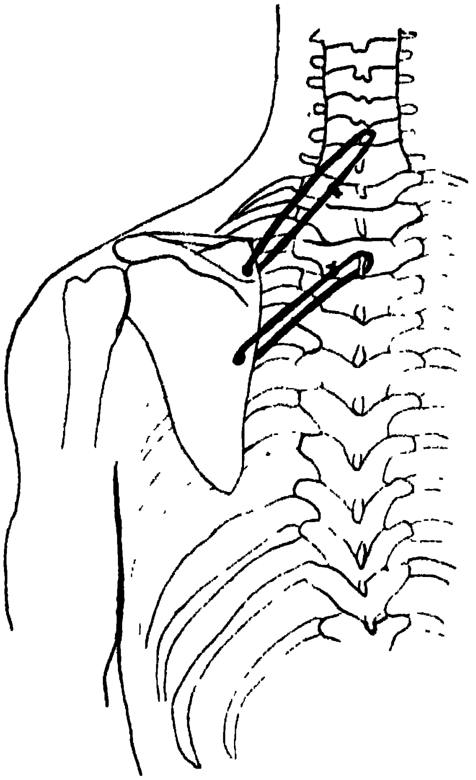


Fig. 75.—The scapula is slung to the spines of the 6th cervical and 3rd dorsal vertebræ by two strips of fascia.

Skin Traction in Gaping Wounds.—E. D. Highsmith[2] states that continuous traction gives admirable results. The loose epithelial cells and oil from the skin on each side of the wound are removed by rubbing with a sponge saturated with ether. The ordinary dress-hook-fasteners are sewed on pledgets of gauze, ½ in. wide by 1 in. long. These strips are thoroughly saturated on the under side with Carpentier's court plaster, and are placed near the skin margin on each side of the wound in such a manner that small rubber bands can be fastened in the hooks in order to produce continuous traction and gradually draw the skin margin together. To avoid irritation of the skin, these pledgets of gauze should not remain in the same position longer than 48 hours. When they are removed they should be re-applied in a different location. (*See also* MEDICAL ANNUAL, 1928, pp. 434, 435.)

Dropped Shoulder.—Professor A. K. Henry,[3] of Cairo, describes a method of slinging a scapula. The case described was a youth of seventeen who had been operated on eighteen months previously for enlarged glands in the left

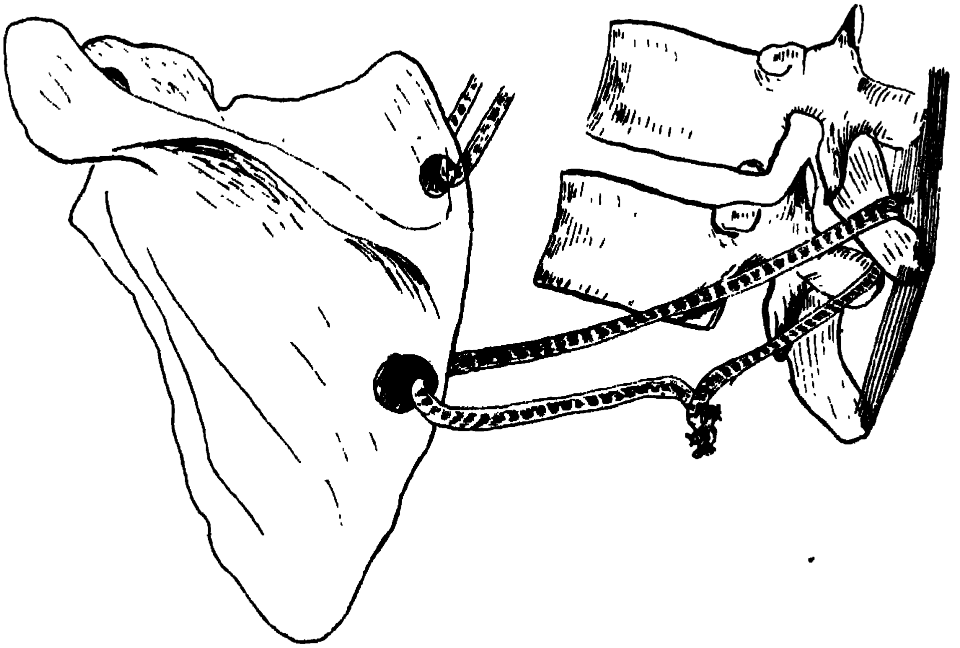


Fig. 76.—The fascial sling is passed through a hole in the scapula and round the base of the spinous process. Its ends are intertwined and sutured, and it is stitched to the interspinous ligaments. (*Figs.* 75, 76 *by kind permission of the 'British Journal of Surgery'.*)

side of the neck. The point of the left shoulder was depressed and the medial angle of the scapula projected prominently at the left side of the neck. The trapezius muscle was wasted; the sternomastoid was paretic. There was slight winging of the left scapula. The patient was unable (1) to raise his left arm above the horizontal position, (2) to touch the right cheek with his left hand, or (3) to put his left hand freely behind his back. There was blunting of sensations of touch and pain over the distribution of the great auricular and the transverse cutaneous cervical nerves. The operative procedure is shown in *Figs.* 75, 76. The final result was all that could be desired. The reviewer saw this case in Cairo in December, 1928. The functional result was perfect. The two strips of fascia had become thicker and stronger, and could be felt as firm cords guiding and controlling the scapular excursions.

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PNEUMOCOCCAL PERITONITIS. (*See* PERITONITIS.)

PNEUMONIA.—(*See also* PHARMACOLOGY AND GENERAL THERAPEUTICS—OXYGEN.)

W. H. Wynn, M.D., F.R.C.P.

BACTERIOLOGY.—Much difference of opinion exists as to the value of typing the pneumococci in pneumonia. R. L. Cecil, H. S. Baldwin, and N. P. Larsen,[1] in a study of 2000 cases, maintain that the time has come when every case of lobar pneumonia should be typed; whereas F. R. Ferguson and R. Lovell[2] find no relation between the clinical picture, the mode of onset, the course, the severity, the mode of termination, and the causative type, and C. H. Whittle[3] states that the classification of pneumococci into types has been of no value for determining the pathogenicity of a strain. The idea that the three specific types—I, II, and III—might represent the virulent, disease-producing strains, and Type IV the avirulent, has not been borne out as the results of his experiments. Cecil, Baldwin, and Larsen[1] have made a clinical and bacteriological study of 2000 typed cases of lobar pneumonia seen in the Bellevue Hospital, New York. All cases of clinical pneumonia which showed frank signs of consolidation were included. Practically all were lobar in type. Of the 2000, 83·1 per cent were in men and 16·9 per cent in women. One-half the cases occurred between 20 and 40 years of age. Of all the cases, 95·65 per cent showed some type of pneumococcus, and 3·8 per cent were apparently due to *Streptococcus hæmolyticus*, but it is probable that several of the latter were originally pneumococcus infections and the streptococcus was a secondary invader; eight cases were due to Friedländer's bacillus, and in one the influenza bacillus alone was found; but in 330 the influenza bacillus was found in association with the pneumococcus, in 82 the *Streptococcus hæmolyticus* with the pneumococcus, and in 28 all three organisms. In a few there was more than one type of pneumococcus. The presence of the influenza bacillus had apparently little effect upon the mortality-rate or incidence of complications. The incidence of the various types of pneumococcus was as follows: Type I 33·6 per cent, Type II 19·1 per cent, Type III 13·3 per cent, and Type IV 33·1 per cent. The incidence of the types varied from year to year. Thus Type I was 45·2 per cent during the season 1920–21, and only 21 per cent for 1922–3. During epidemics of influenza there was always an increase of Type IV. Young people appeared to be especially susceptible to Type I, while the elderly were susceptible to Type III. Type I was more common in men, whilst Type III was almost twice as common in women. They divided their cases into two large groups—primary pneumonia, and pneumonia secondary to some infection of the upper respiratory tract. The latter comprised

46·7 per cent, but this figure is certainly too low, as a complete history could not always be obtained. As would be expected, Type I predominated in the primary cases, and Type IV in the secondary. In patients suffering from some chronic constitutional disease there was a strikingly high incidence of Type III, this being three times as common as Type I. It has usually been found that the right lower lobe was more frequently involved than any other, but in these 2000 cases the left lower lobe was more often involved than any other in infections of a single lobe (505), the right lower lobe coming next (440). The right side, however, was involved more frequently than the left (1119 to 974 cases). By far the commonest of the two lobe infections was the combination of the right and left lower lobes (308). Blood cultures were taken in 829 cases, with 89 positive results, the incidence being higher with Types II and III than with I and IV. No striking feature in the course of the disease could be shown to be characteristic of the various types. The average duration of the disease was 8·8 days, and in 49·6 per cent the termination was by crisis. The mortality according to type was: Type I 20·7 per cent, Type II 42·0 per cent, Type III 41·6 per cent, Type IV 29·2 per cent; average 30·8 per cent. The lower mortality of Type I cases may be due in large measure to the fact that it is the predominant type in young people. Age was the chief factor in the mortality, the rates being: Under 20 years 11·1 per cent, 20 to 30 years 15·5 per cent, 30 to 40 years 24·2 per cent, 40 to 50 years 34·8 per cent, 50 to 60 years 42·7 per cent, over 60 years 52·7 per cent. In patients under 40 Type III infection was comparatively mild, but after 40 the death-rate for Type III became high, but no higher than that for Type II. Serious complications occurred in 9·1 per cent, the percentage according to type being: Type I 12·1 per cent, Type II 7·0 per cent, Type III 6·3 per cent, and Type IV 8·5 per cent. There were 99 cases of empyema. Of empyemas developing before the 7th day 90 per cent died, between the 7th and 14th days 51·8 per cent, and on or after the 14th day 22·9 per cent.

F. R. Ferguson and R. Lovell[8] have investigated the cases of lobar pneumonia in Manchester, 1925–1927. There were 193 cases of essentially primary pneumonia, lobar in type, and in all the pneumococcus was isolated from the sputum. In 70 per cent there was a definite history of a preliminary malaise and then a sudden onset of more severe symptoms. In 90 per cent there was a rigor at the onset. Headache and vomiting occurred in the younger members at the onset. Sputum was rusty in about half the cases. Of the 193 cases, 35 died (18·1 per cent) and 44 had complications (22·8 per cent). The types of pneumococcus found were: Type I 43·1 per cent, Type II 4·3 per cent, Type III 0, Type IV 52·6 per cent. The outstanding points are the absence of Type III and the paucity of Type II. In no previous investigation has Type III been absent. The mortality and complications for the types were: Type I mortality 26 per cent, complications 22 per cent; Type II mortality 20 per cent, complications 40 per cent; Type IV mortality 24·6 per cent, complications 19·7 per cent. These figures do not warrant the conclusion as to any particular type having a higher death- or complication-rate, which contrasts with the conclusions of American investigators that Types II and III have a death-rate almost twice as high as that of Types I and IV. Age appears to be the most important factor: 76 per cent of the cases occurred between the ages of 20 and 49. The death-rate for patients under 20 was 3·1 per cent, whereas that for patients over 50 was 33·3 per cent. In a series of 101 cases examined in relation to the presence of a pure culture of pneumococcus or a mixed culture, 46 were pure and 55 mixed; the percentage of deaths in the pure was 32·6 per cent and in the mixed 20 per cent. There was no apparent relation between the presence of any particular type and of a mixed culture. They conclude that it would be more practicable and useful to classify pneumonias on a bacteriological than on a clinical or morbid anatomical basis.

R. L. Haden[4] points out that the low *chloride excretion* in pneumonia, which is due to a low level in the blood, is associated with accelerated protein catabolism, with high non-protein nitrogen in the blood, and that there is often an alkalosis. A similar combination is seen in experimental intestinal obstruction, in X-ray intoxication, in cutaneous burns, and in serum disease. The common factor appears to be a protein intoxication of unknown origin. He records satisfactory results by the administration of **Sodium Chloride**, either by mouth, 1 or 2 grm. being given every hour until the sodium chloride in the urine was normal, or in extreme cases intravenously as a 1 or 2 per cent solution, preferably in 10 per cent glucose solution. Marked improvement often followed in patients critically ill, and patients under treatment remained in a satisfactory condition in spite of severe infection.

R. A. Hickling[5] finds that a *monocytosis* develops in the circulating blood in lobar pneumonia. At the beginning of the disease the monocytes are within normal limits, but in all cases they rise to a point definitely above the normal maximum, and the increase lasts for a few days, the peak occurring generally after the crisis. The rise usually occurred after the polymorphonuclears had returned to normal, but in all cases it preceded the rise of lymphocytes. He gives evidence that the monocytosis is closely associated with resolution of the affected lung.

J. B. Youmans and R. H. Kampmeier[6] found that, of 30 patients with post-pneumonic complications (unresolved pneumonia, fibrosis, pulmonary abscess, and bronchiectasis), *syphilis* was proved to be present in 12 and was doubtful in 6 others. They consider that failure of resolution may be due to the influence of syphilis and therefore may be preventable. Their cases are few, and suggest the need for further investigation of this point.

C. M'Neil and W. A. Alexander[7] have studied *pneumonia in childhood*, and find that in six and a half years 558 cases were admitted out of a total of 2377 children in one ward at the Edinburgh Sick Children's Hospital. There were 100 deaths, a rate of 17·9 per cent. Of 279 cases under two years the death-rate was 30 per cent, but from two to twelve the rate was only 5·7 per cent. A. Macgregor[8] made 100 consecutive post-mortems on these cases, and found that from birth to two years there were 9 lobar pneumonias to 72 broncho-pneumonias, and from two to twelve years 2 lobar pneumonias to 17 broncho-pneumonias. Clinically, cases of lobar pneumonia occurred through the whole period of childhood with fairly steady frequency, but the cases of broncho-pneumonia were concentrated in the first two or three years, and it was this concentration of the one type with fairly large numbers of the other type that explained the extraordinary frequency of pneumonia in the first years. While the common pulmonary complications of lobar pneumonia were on the surface of the lung and were pleurisy and empyema, those of bronchopneumonia occurred within the lung and were chronic bronchitis (or peribronchitis), bronchiectasis, and fibroid lung.

Treatment.—Successful results with **Antipneumococcal Serum** were formerly limited to Type I infections, and the serum had so low a concentration that effective dosage was difficult. Improved methods of manufacture have aimed at producing a refined concentrated polyvalent serum, and **Felton's Polyvalent Serum** appears to make a distinct advance. It is a solution of certain globulins of the serum of horses immunized by killed cultures of pneumococci. The globulins are precipitated by distilled water and redissolved in concentrated form. It is claimed that the final solution can be made 10 to 20 times as strong as the original serum. The serum is standardized, the unit being the amount that will protect a mouse against a million fatal doses of pneumococcal culture. W. H. Park and G. Cooper[9] point out that the Hygienic Laboratory of New York requires only a minimum amount of Type I antibody of 50 units per c.c., and that an antibody solution can be marked polyvalent when its content of Type II and Type III antibodies is less than 1 unit per c.c. Even with Felton's serum specimens varied—Type I between 300 and 2000 units per c.c., Type II between 100 and 800 units, and Type III between 10 and 100 units. They urge that the units for each type should be stated on each specimen of serum. Toxic patients may require very large amounts of serum. They examined the content in toxic substances of the blood of various pneumonia patients, and found that with Type I as much as 50,000 units might be required, and with Type II with the most toxic cases as much as 500,000 units, which would require about 500 c.c. of serum. Their opinion on dosage is that every patient on admission should receive as nearly as possible 10,000 units of Type I and of Type II antibody. As long as the temperature remains high, or if septicæmia is present, the injections should be continued every eight to twelve hours. When the case has been typed a monovalent serum can be given. If the pneumonia is due to Type IV it is well to stop after the third injection, as the antibody for these strains is so feeble that it is a waste of serum to continue. The same is also true for Type III until a specific serum for this is available.

Park succeeded in immunizing a horse with Type II pneumococcus, and obtained a serum of good potency. This was used by H. S. Baldwin and O. R. Rhoades,[10] who found that it was possible to sterilize the blood of patients with Type II pneumonia with septicæmia if the serum were administered early, and that in cases without septicæmia the serum might establish a balance of protective bodies in the blood and lessen the chance of subsequent bacteriæmia.

M. B. Rosenblüth[11] has made blood cultures on 500 patients with lobar pneumonia, and found positive results in 22·4 per cent. He concludes that in cases not treated with serum presenting bacteriæmia of such a degree that it can be demonstrated in 1 or 2 c.c. of blood, the prognosis is definitely bad, and that specific serum is especially indicated in such patients, whilst in those with negative cultures it is indicated to prevent bacteriæmia. The effect of serum on fatality is exerted largely on cases showing a bacteriæmia, whilst patients without bacteriæmia are benefited relatively little. Baldwin and Rhoades[12] have shown that the development of bacteriæmia occurs in the absence of sufficient 'protective substance' in the blood, and that the aim of specific treatment is to prevent bacteriæmia by developing a balance of protective substance.

F. B. Cross[13] has treated 126 cases with **Numoquin-Base (Ethylhydrocupreine).** Morgenroth and Levy first published an account of the pneumococcocidal influence of ethylhydrocupreine in 1911, but clinical trial showed that the therapeutic and toxic doses were too close together to make it of value in treatment. Mendel in 1916 used the insoluble base, giving it by mouth with milk to retard absorption. Cross advocates giving 4 gr. every five hours for fifteen doses. Five or six ounces of milk are given with each dose. Additional milk may be given freely, but beyond small amounts of water nothing else is permitted by mouth whilst the drug is administered. Cardiac stimulants and sedatives must be given hypodermically or by rectum, and laxatives are contraindicated. His series of cases show a slight advantage as regards mortality with the treated cases, but he was impressed with the lower temperatures, the increased comfort, and the lessened tendency to extension of the disease shown by these patients. He quotes F. Kraus, who, in reports from six hundred physicians throughout the United States dealing with 3008 cases treated with numoquin-base, had a mortality of only 5·08 per cent.

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PNEUMONIA, RHEUMATIC. (*See* LUNG, RHEUMATIC.)

PNEUMONIA, SYPHILITIC. (*See* LUNG, SYPHILIS OF.)

POISONING. (*See also* ARSENICAL POISONING.)

Ivor J. Davies, M.D.

Lead.—J. P. Leake[1] in a contribution on lead hazards, referred to the investigation made under the direction of a committee appointed by the Surgeon-General of the U.S. Public Health Service to determine the hazard from the use of *lead in ethyl gasoline*. Briefly, the results were that there was no evidence of lead poisoning from such gasoline after exposures approximating two years. Studies are nevertheless being continued to determine whether longer exposure might not produce symptoms of plumbism. No such symptoms have been found in the year that has elapsed since the report was made.

The investigation developed several facts which are worthy of mention in connection with lead hazards in general. Perhaps the most striking of these facts was the discovery of a considerable proportion of lead in the dust of garages, even when ethyl gasoline had not been used. The amounts of lead found in other industrial dusts were about the same as were found in garages during the ethyl gasoline investigation, and indicate the widespread diffusion of lead dusts. To detect very slight degrees of lead poisoning, as distinct from lead absorption, an instrument based on the Martin muscle test for clinical use in poliomyelitis was devised. By its use, definite lead palsies which were not apparent by the ordinary tests were detected. When tested on the machine, the flexors in the paralytic cases showed just as much diminution of power as the extensors, and the corresponding muscles of the left hand to an equal degree to the right. Leake stated that stippling of the red blood-cells showed a remarkable parallelism with apparent lead absorption, and when carefully carried out was their most important single clinical check on this phase of the studies in lead. It is probable that the presence of definitely stippled cells in considerable number without other marked changes in the blood picture is the one criterion of this sort which means lead absorption with a certainty of the same order of magnitude as applies to the Wassermann reaction in syphilis. A criterion of danger may be set at more than 20 stippled cells per 100,000.

W. S. Leathers and H. J. Morgan[2] have made a study of *lead poisoning in an enamelling plant*. A careful physical examination of 39 employees in an enamelling plant led to a definite diagnosis of plumbism in 15 cases (39 per cent), and a diagnosis of probable lead poisoning in eleven cases (28 per cent). In 13 of the 39 men plumbism was not present but was potential. The chief cause of poisoning was the breathing of lead-laden dust resulting from the spraying of pieces of iron stoves with enamel mixture. This was done in booths, spray-guns being used from which the mixture was discharged under 80 lb. of pressure. The following corrective measures were instituted: (1) Personal hygiene; (2) Correction of unhygienic conditions in the plant; (3) Adequate medical supervision. The importance of obtaining morbidity reports of occupational diseases is obviously a need with the increased expansion of industry.

J. Uttal[3] reports three cases of *lead poisoning from snuff.* All three cases were chemically proved by the identification of lead from the snuff. Two resulted in marked polyneuritis with bilateral wrist-drop and extensive muscular atrophy; one gave rise to a marked secondary anæmia. Snuff may contain lead from two sources: (1) Snuff wrapped in tinfoil containing a large portion of lead in its composition may cause lead poisoning if the contents become moistened, by causing minute amounts of lead to pass into solution and become incorporated in the snuff. (2) Lead may be an actual adulterant of snuff tobacco. It is used in the process of the manufacture of snuff as a colouring agent in the form of lead chromate. In the cases reported, the snuff suspected and proved to contain lead was the most inexpensive of the available brands. The continued sale of such snuff constitutes a menace to public health.

Mushrooms.—Poisoning as a result of eating *Amanita phalloides* fungi is not uncommon in the United States, but is more common elsewhere. As a rule, attention has been focused upon the rather severe and striking gastro-intestinal symptoms, and the familiar picture of violent abdominal pain, nausea, vomiting, diarrhœa, and cold clammy sweating has been described by many authors. Concerning the cardiovascular system, however, the available literature reveals only the most obscure observations in regard to the heart and circulation in mushroom poisoning. A. S. Hyman[4] reports a case of *Amanita phalloides* poisoning with cardiovascular symptoms which were studied by graphic and other methods. Electrocardiographic examination revealed changes usually ascribed to right bundle branch block.

An irregularity in the pulse was found to be due to right ventricular extrasystoles. Post-mortem findings in such cases show extensive myocardial damage due apparently to a fatty degeneration of the muscle-cells. The long period required for repair (about nine months) suggests the extent of the cardiac mischief. The graphic evidence of extensive and widespread myocardial disease, while usually of ominous prognosis, does not always exclude complete recovery. An extensive bibliography is appended.

Stovarsol.—W. L. Bender[5] writes on stovarsol (spirocid) poisoning, with a report of six cases. Since its introduction in 1922 for the treatment of syphilis, it has also been given in amœbiasis, lambliasis, malaria, and yaws, as well as in chronic malnutrition for its general tonic effect. It has been most used in the treatment of syphilis, especially in France and Germany, where much difference of opinion exists on its value as compared with other arsenical preparations. The intestinal parasitic affections named appear to be definitely influenced, and the effect on yaws is dramatic. It was first synthetized by Ehrlich in 1909 and designated 'preparation 594'. Chemically it is an organic arsenical preparation, acetyloxyaminophenylarsenic acid, containing 27 per cent of arsenic. According to German authors it is identical with spirocid manufactured by Höchster Farbwerke. Bender submits the following conclusion: Stovarsol (spirocid) is a useful remedy in a number of infections, and its use may be expected to become more general. It produces undesirable symptoms with considerable frequency; although a variety of manifestations have been reported, there are certain outstanding signs—such as fever, skin eruption, and adenitis—which appear quite constantly as a syndrome characteristic of stovarsol poisoning. Though reactions are usually mild, some exceptionally severe ones have been reported, including exfoliative dermatitis, and one fatality. While individual idiosyncrasy is the most important cause of ill effects from the drug, the consideration of lesser factors, such as selection of cases for its use and the dosage, is important. The acquaintance with and recognition of the early toxic symptoms are essential in prescribing stovarsol, since in most cases prompt discontinuation is all that is necessary to avoid serious poisoning.

Benzol.—F. T. Hunter[6] reports four cases of chronic benzol poisoning, two of which were fatal. Chronic poisoning may be produced by ingestion or subcutaneous injection of liquid benzol. Industrial poisoning, however, is practically always produced by inhalation of the fumes. An aplastic anæmia, with a marked and early leucopenia and fall in blood-platelets, results. Continued exposure to benzol fumes causes headaches, vertigo, gastro-intestinal disturbances, anorexia, loss of weight, progressive weakness and pallor, bleeding from the mucous membranes, and purpura. The absence of palpable spleen in the presence of purpura is noteworthy. A febrile course and a leucopenia below 1000 seem to point toward a fatal outcome. Treatment should consist of transfusions, and the prevention of intercurrent infection. Attention is called to the seriousness of the condition and to the increase in the number of cases within recent months. Examination of the blood will detect early cases before the stage of marrow aplasia is reached. Adequate medical supervision of factories using benzol is indicated.

Brucella Abortus Infection.—R. L. Sensenich and A. S. Giordano[7] report seven cases of *Brucella abortus* infection. Evidence pointing to possible infection in humans by this organism was first presented by W. P. Larson and J. P. Sedgewick[8] in 1913, and this possibility was emphasized by Alice C. Evans,[9] who in 1918 defined the close relationship between *B. abortus* and *B. melitensis* (Malta fever). The infection in each case arose through the consumption of unpasteurized milk from cows known to be affected with *B. abortus*. The characteristic symptoms of the infection in man are anorexia, loss of weight and strength, headache and chills, fever and sweats of varying intensity throughout long periods of time, frequently with intermissions. The fever has a tendency to exhibit undulations which may vary in character and in length. Evidence of the effect of the disease on the nervous system is constant, and arthritis is a common symptom. The consideration of *B. abortus* infection in the differential diagnosis of all conditions exhibiting variable combinations of these symptoms will undoubtedly reveal more frequent occurrence of this disease. Isolation of the organism from the blood or a positive agglutination reaction makes the diagnosis definite, although the disease may be present with negative manifestations. (*See also* MALTA FEVER.)

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POISONING BY 'META FUEL' TABLETS (METACETALDEHYDE).

Reginald Miller, M.D., F.R.C.P.

That children can be severely poisoned by chewing and swallowing 'Meta Fuel' tablets is not widely known, and as these tablets are extensively used as a substitute for methylated spirit, the public should be warned of their possible danger. Many doctors use 'Meta' lamps instead of spirit lamps owing to their convenience. 'Meta Fuel' is sold as small white tablets or bricks such as may not be without an attraction to small children. It should not be left within their reach. It consists of metacetaldehyde, an isomer of paraldehyde. When swallowed the tablet is slowly absorbed. It may produce some abdominal pain and vomiting. When absorbed it acts as a severe poison to the nervous system, producing coma and convulsions. Excretion occurs through the kidneys, which may show irritation by the presence of albuminuria. The metacetaldehyde can be recognized in the urine. The first case published of 'Meta' poisoning was recorded by P. Gautier and R. Colomb[1] in 1926. Two or three other cases were reported on the Continent during 1927. The first

English case was that published by W. H. Willcox and Ainsworth Mitchell[2] in 1927. The reviewer has recently recorded another instance.[3]

The treatment of metacetaldehyde poisoning consists in washing out the stomach and giving a smart purge. The convulsions should be treated (or if possible prevented) by the use of bromide and chloral. None of the recorded cases has proved fatal, but the severity of the symptoms in some instances suggests that a fatality is not impossible.

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POLIOMYELITIS, ACUTE.

Sir James Purves-Stewart, K.C.M.G., C.B., F.R.C.P.

EPIDEMIOLOGY.—Poliomyelitis is an acute specific fever, which may occur either sporadically or epidemically. In England, as in other countries, it is endemic, with a special frequency during the late summer and early autumn months. During the month of October, 1926, there was a specially acute epidemic in Kent, affecting a number of schools in the neighbourhood of Broadstairs, a seaside town hitherto conspicuous as a health resort. The disease started practically simultaneously in all the schools affected; it did not spread to adjoining districts, and the whole outbreak came to an end in a fortnight.

As to the mode of transmission of the disease, the most widely accepted theory is that of direct infection through the upper respiratory passages. This theory is based largely on the researches of I. Wickman,[1] who has shown that the virus, a filter-passing affair, is present in the upper respiratory passages not only in active cases but also in abortive cases and in healthy contacts, and that experimental poliomyelitis can be induced in monkeys within twenty-four to forty-eight hours by inoculation of the nasal mucosa with material derived from the upper respiratory passages of infected human subjects. Other methods of infection have been suggested. The likelihood of flies, fleas, or other insects as carriers of the infection has been excluded by various carefully conducted tests. Drinking-water, milk, fruit, and various other articles of food have been accused in turn, but with almost constantly negative results. One epidemic, however, in the town of Cortland, New York State, in December, 1925, was investigated by W. L. Aycock[2] in conjunction with A. C. Knapp and E. S. Godfrey. The explosive outbreak of a group of eight cases suggested a common source of infection, and it was found that all of them had been supplied with milk from the same dairy. Further inquiry showed that there had been a recent case of poliomyelitis in a lad who milked the cows of that particular farm. They admit, however, that it is improbable that this is a common mode of spread for the disease.

It is of interest that the incidence of epidemic poliomyelitis is generally greater in small communities and in rural districts than in large cities. It has been suggested that the concentration of population, even with greater person-to-person contact and widespread dissemination of the virus, results in a widespread immunization, possibly due to subinfective doses of the virus. On the whole, then, we must accept direct contagion by 'droplet infection' from one person to another as the main, though not the only, mode of spread.

A large amount of evidence has now accumulated which shows that the virus is present in the nasal, buccal, or faucial secretions of individuals who may or may not develop the disease. In other words, carriers, who themselves are usually, though not invariably, immune, harbour the infection and transmit it to others. Such carriers may conceivably be more numerous than the individuals who actually develop the disease. For example, C. Kling, A. Petterson, and W. Wernstedt[3] demonstrated the existence of 18 healthy carriers amongst the non-infected members of six families in each of which only one individual suffered from the disease. Contagion, therefore, is not of a high order of virulence, and the disease, in comparison with other infective maladies, rarely runs riot. Indiscriminate spread in public institutions, schools, and hospitals does not occur. Bed-to-bed infection in hospitals is a risk so slight as to be negligible. Spontaneous infection even of heavily infected experimental monkeys has never been recorded, whilst no case of the disease has developed in those whose duties required them to handle such laboratory monkeys. Both abortive cases and healthy carriers constitute a definite menace to other individuals; nevertheless infection never appears to occur regularly from one contact to another in an unbroken series. Clinical experience shows that the maximum period of infectivity is during the incubation and pre-paralytic stages, and that, by the time actual paralytic phenomena have developed, the virus is less easily communicable. J. Collier[4] goes so far as to maintain that the disease is spread exclusively by healthy carriers, and that every epidemic of poliomyelitis is preceded by a 'carrier epidemic' in the course of which susceptible contacts are infected, producing an outbreak of the disease. In this way it is suggested that we can account for the practically simultaneous mass-infection of all the available susceptible subjects. F. M. R. Walshe,[5] however, shrewdly reminds us of the risks of depending too confidently on the healthy carrier mode of transmission, and directs attention to several carefully observed epidemics in semi-isolated communities in which cases occurred not as a sudden wave but successively, from day to day, with a definite incubation period between the onset of cases in the same household. If Walshe is right, we must continue to believe that Wickman's theory of both case-to-case and of carrier infection is correct. The fact that no instances have been recorded of spread of the disease within hospital wards cannot logically be interpreted as excluding case-to-case infection without also ruling out carrier infection.

Another point of interest is indicated by W. L. Aycock and P. Eaton,[6] who made a comparative study of the incubation periods of measles, scarlet fever, and poliomyelitis, and found that in each of these diseases the incubation periods fall into two distinct groups, a short and a long. A short incubation indicates simultaneous infection from a common source; a long incubation indicates true secondary case-to-case infection. On this assumption, although true secondary cases of poliomyelitis are less common than in measles or scarlet fever, their occurrence seems to be well established.

In view of the conflicting views as to its mode of spread, what is the duty of the physician in charge when an acute case of the disease makes its appearance? To be on the safe side, we would suggest the following: He should insist on segregation of the patient, so as to prevent 'droplet' infection, for not less than two and not more than three weeks from the date of the febrile onset. Meanwhile the nasopharyngeal and intestinal discharges should be assiduously disinfected; the room, clothes, and person of the patient should be disinfected, also not forgetting the person and clothing of the nurse and physician in attendance. Children in the same household who have been in contact with the patient during the incubation period or the acute stage should be restricted from going to school or other public assemblies for a period of fourteen days from the last date of contact, by which time they are unlikely themselves to develop the disease. The nasopharynx of every contact, whether adult or child, should be examined for the specific organism to see if he be a carrier, and gargling with hydrogen peroxide or potassium permanganate (both of which drugs, in contrast to carbolic acid and its congeners, are specially toxic to the organism) should be prescribed. There is no adequate reason for closing a school in which an outbreak has occurred, but daily medical supervision of such a school should be carried out until the epidemic has disappeared. All children having febrile symptoms should be isolated pending diagnosis, and in any suspicious case the blood and cerebrospinal fluid should be carefully examined, since they show well-marked changes even in the pre-paralytic phase of the disease.

Serum Treatment.—There is now sufficient evidence to show that the serum from convalescent patients has definite therapeutic usefulness in poliomyelitis. The effectiveness of such treatment depends upon early diagnosis, also upon the employment of a potent serum in sufficiently large doses and, if necessary, in repeated doses. Many observers, notably Pettit, of Paris (as recorded in the MEDICAL ANNUAL of 1928) select the intrathecal route of administration, supplemented by intravenous or intramuscular injection as a less valuable adjuvant. Certain objections have been advanced against intrathecal serum treatment. For example, it was observed experimentally by A. Netter[7] that intrathecal injection of normal serum into monkeys in the early stage of the disease hastens and renders more severe the resultant paralysis. There is therefore the possibility that in the human subject, since it is not possible to test the potency of each serum before it is used, its introduction into the spinal theca may prove harmful if its immunizing properties happen to be slight. Such serum, moreover, has to be carefully prepared, rigidly sterilized, and reasonably free from hæmolysed corpuscles, so as to be used with safety. These difficulties, of course, are not insuperable.

Inasmuch as the quantity of convalescent serum available for injection is necessarily very small, it is advisable to inject it by the intrathecal route, so as to get as near as possible to the diseased focus. E. Etienne,[8] of Nancy, suggests intrathecal doses varying from 8 c.c. to 13 c.c. ; with larger doses uncomfortable meningeal reactions are liable to occur. This intrathecal medication can be repeated on several successive days. The difficulty of securing serum from convalescent patients has been met by preparing a serum from an immunized animal, as carried out by Pettit at the Pasteur Institute in Paris. Etienne records nine cases of complete recovery after repeated intrathecal injections of such serum.

E. B. Shaw and H. E. Thelander,[9] of San Francisco, in view of the fact that poliomyelitis is a blood-borne infection, prefer to bring the curative serum into contact with the virus by way of the blood-stream. They consider that intravenous administration of convalescent serum is liable to objections, e.g., the possibility that an artificially preserved serum may contain too much precipitate for safety ; also the further desirability of blood-grouping to ensure that the donor and the recipient belong to a homologous blood-group. For these reasons Shaw and Thelander prefer intramuscular administration as a convenient mode of access to the blood-stream. Absorption of human serum by this route is fairly prompt and presents none of what they consider to be the alarming dangers of intrathecal or intravenous injection. Reasonable asepsis is required, but the presence of precipitate or of hæmolysed blood-cells does not introduce any difficulties by this route. As a matter of fact, they find that when convalescent serum is not at hand and an available convalescent patient can be bled, the whole blood, preferably citrated to facilitate absorption, may be used for intramuscular injection. They claim as the greatest attraction of the intramuscular method that in a very early case, in which the diagnosis is as yet insecure, and when a confirmatory spinal puncture may not be feasible, if serum or a convalescent donor is at hand, the patient can receive simple and effective treatment at the most opportune moment without being in any way jeopardized.

It is universally admitted that the earlier in the disease specific treatment is instituted, the better are the results to be expected. The difficulty then arises that cases treated early may be so completely aborted that it is impossible to prove afterwards that without treatment paralysis would have resulted. Parallel series of cases left untreated, if one were bold enough to do this, would not necessarily clear up this difficulty, since it is impossible from early symptoms and signs in any given case to foretell how mild or how severe later developments may be. Pre-paralytic diagnosis of the disease, so essential for efficient treatment, is rarely possible, except during an epidemic of poliomyelitis. Early symptoms suggestive of poliomyelitis consist in fever, malaise, headache, pains in the back and limbs, rigidity of the vertebral muscles with resistance to passive flexion, muscular tenderness on handling the limbs, and even Kernig's sign. Meanwhile the cerebrospinal fluid is found to be under increased pressure and to show a pleocytosis, mainly of lymphocytes, together with an excess of protein, whilst the blood shows a polymorph leucocytosis, sometimes rising as high as 25,000 per c.mm. Now is the moment for serum treatment, before paralytic signs have appeared. But even when the malady has reached the paralytic stage, the sooner serum treatment is initiated, the better are the prospects of recovery. Shaw and Thelander give a tabular account of 81 cases, of whom 43 received convalescent serum intramuscularly during the active stage of the disease. In 17 cases in which treatment was given within forty-eight hours, all of them recovered without paralysis, although 2 had already presented bulbar symptoms. Of 6 cases treated during the third day after onset of symptoms (all except one showing some already paralysed), 3 had persistent paralysis and 1 died. Of 10 cases treated on the fourth day (7 of them already with paralysis), 3 had persistent paralysis and 2 died. In 10 cases treated on or after the fifth day (all of them already paralysed), 7 had persistent paralysis and 2 died. In contrast to these, 38 cases were untreated, and 33 of them showed permanent residual paralysis, whilst 3 died.

The amount of convalescent serum injected intramuscularly in the foregoing cases varied from 20 to 50 c.c. of convalescent serum at intervals of several hours, up to 80 c.c. of whole blood, citrated, at a single dose.

It is obvious that, except during an epidemic, fresh convalescent serum is not likely to be available. It is therefore desirable that stocks of pooled convalescent serum should be collected so as to be on hand for sporadic cases and at the outbreak of epidemics.

REFERENCES. [1]*Nervous and Mental Disease Monographs*, No. 16, 1913; [2]*Jour. Amer. Med. Assoc.* 1926, 635; [3]*Zeits. f. Immunitatsf.* 1912, xii, 657; [4]*Lancet*, 1927, i, 321; [5]*Ibid.* 326; [6]*Amer. Jour. of Hyg.* 1925, Nov., 724; [7]*Bull. de l' Acad. de Med.* 1915, lxxiv, 403; [8]*Rév. méd. de la Suisse Rom.* 1927, Aug. 25, 1923; [9]*Jour. Amer. Med. Assoc.* 1928, June 16.

POST-MORTEM EXAMINATIONS IN GENERAL PRACTICE.

Geoffrey Hadfield, M.D.

When a practitioner has accepted the responsibility of investigating the cause of death he should never lose sight of the fact that he has set his hand to a task which may cause him considerable anxiety, and that cases where the cause of death appears beyond dispute are often those in which one's observations and deductions are most persistently questioned. The practitioner performing the actual examination is in a fortunate and unique position: he sees the organs and tissues when they are least altered by putrefaction. If his observations are sound and complete they are invaluable and cannot be gainsaid; if they are superficial and hurried, there is a risk not only of his jeopardizing his professional reputation, but also of being instrumental in bringing about a miscarriage of justice.

Preliminary Steps.—The following precautions are undoubtedly worth while taking before starting the actual examination:—

1. See the body in the position in which it was discovered; if there is the slightest indication that position or surroundings are of importance, photograph it in position. If it has been moved, insist on seeing it before the clothes are removed; if it is undressed, see the clothes.

2. Insist on doing the examination at the earliest possible moment. Discourage any legal delay. Avoid performing the examination in artificial light. Post-mortem changes are the bugbear of accurate morbid anatomical observation, always modifying, often entirely blotting out, the changes produced by injury and disease, and frequently simulating pathological changes so closely that long experience is necessary to eliminate them from the pathological diagnosis.

3. Collect several sheets of notepaper and record any preliminary facts which bear directly on the cause of death. Head EACH with the date. Communicate with any medical man or hospital who may possibly provide details of illness or injury. Give special importance to names, dates, and measurements, none of which should ever be trusted to the memory. These notes, of necessity rough, abbreviated, and for personal use only, are likely to prove very precious.

4. If after the preliminary inquiry there should be definite, though perhaps slight, indications that grave or important issues are involved, ask for expert advice and assistance without delay. In the writer's experience this is rarely withheld. If this course is thought to be unjustified, it is wise where there is an element of suspicion to invite a colleague to witness the post-mortem.

5. Make sure the body has been identified, and by whom. If not, make careful notes of any fact which may assist identification.

Instruments and Equipment.—Every effort should be made to perform the examination in a mortuary, or in some building away from the house, preferably one which can be hosed down, such as a garage. No post-mortem can be satisfactorily performed in a bedroom. When a clear necessity has arisen for the examination, it should be remembered that to allow sentiment to interfere with thoroughness may later on cause the practitioner the keenest regrets.

The following is the minimum equipment:—

a. Notepaper and writing material: the former should be dated before setting out.

b. A foot rule, preferably of metal.

c. Two knives: one for opening the body, the other for sectioning the internal organs. A medium-sized 'butcher's' knife serves the first purpose, a long-bladed 'ham' or 'beef' knife is admirable for the latter. Two sharp scalpels should also be included.

d. Rib shears: an efficient substitute for these is a pair of gardener's 'secateurs'.

e. A saw: a carpenter's back-saw or tenon saw, with the teeth set 'well out' and the distal end rounded off, is quite adequate.

f. One rubber and one gum-elastic catheter, the latter with stylet. These are for probing wounds and sinuses, in preference to metal probes.

g. A sharp chisel and a hammer, a pair of dissecting forceps, and one pair of Spencer-Wells forceps.

h. A packing-needle, a supply of stout uncoloured twine, two pairs of surgeon's rubber gloves, some French chalk, a stick of sealing wax, and a supply of tincture of iodine.

i. One 10-oz. bottle containing 1 oz. of undiluted formalin. This is for fixing thin slices of tissue for histological examination, should this be necessary. The formalin is diluted ten times with water or salt solution.

j. Several sterile throat swabs in sterile tubes.

Identification.—If the body is unidentified, pay special attention to :—

1. *Clothing, Jewellery, etc.*, all of which should be scrupulously preserved. Estimate the social status and occupation.

2. *Teeth.*—Especially as regards fillings, plates, and extractions. The teeth and hair are of especial importance in identification of putrefied unidentified bodies.

3. *Malformations.*

4. *Tattoo-marks, Pigmentation, Moles, etc.*

5. *Scars.*—Of vaccination, operation, small-pox, shingles, chancre, lineæ albicantes, hypodermic injections.

6. *In Women,* decide whether a virgin or not, and whether the uterus is parous or not. As the unimpregnated uterus is almost the last tissue to decompose, special note should be taken of its size, etc.

7. *Age.*—This can be judged most satisfactorily by taking skiagrams of the skeleton.

SIGNS OF DEATH. INTERVAL SINCE DEATH.

Cooling.—The average rate of cooling is about 1° F. per hour. The body feels cold to the hand in 10 to 12 hours ; a clothed adult body takes about 28 hours to cool when the external temperature is from 50° to 60° F. The organs usually still feel warm after 14 to 18 hours.

Factors which influence cooling are :—

Temperature of Medium.—The greater the difference between this and the temperature of the body, the more rapid is the fall.

Clothing : State of Nutrition.—If thin or clothed in linen the body loses heat more rapidly than if fat and clothed in a bad conductor such as wool or silk.

Mode of Death.—Any condition in which heat regulation is disturbed tends to retention of heat—sunstroke, some nervous lesions, septicæmias, and acute infections ; so does great muscular activity preceding death—tetanus, strychnine poisoning. Cooling is a little more rapid after hæmorrhage, more rapid still after exposure or surgical shock, following immersion in water, or exposure to moving air after death.

Rigor Mortis.—This is preceded by a general muscular flaccidity for a few hours, during which the muscles contract on electrical stimulation and the pupil reacts to atropine. When rigor sets in such stimuli produce no contraction. During rigor the reaction of the muscle juice becomes acid owing to the liberation of lactic and phosphoric acids from a hexose phosphate—a breakdown product of muscle glycogen. These acids cause swelling of the muscle colloids by altering their powers of imbibition, and, later, probably coagulate them.

The order of appearance of rigor is determined by the relative functional activity of the muscles—those used most are affected first. It thus appears first in the heart and diaphragm one hour after death, in the eyelids in two hours, in the lower jaw in three ; it then spreads to the facial and cervical muscles, the trunk, the arms, and the legs, becoming general in the voluntary muscles in 6 to 7 hours in the summer and 36 to 48 hours in winter. The legs show rigid extension with pes cavus, and the fingers are tightly clenched.

Rigor is abolished by forcible stretching, and does not reappear except in the earlier hours, when it may. Bodies undressed when rigor is established may show no rigor if the limbs were forcibly moved to remove the clothes. Rigor begins to pass off where it appeared first, disappearing in the same order, except that the fingers and toes remain rigid longer than other muscles. It begins to pass off in 36 hours in the summer, 48 to 72 hours in the winter.

The factors modifying the appearance of rigor are :

1. *Dryness and Cold*, which delay and prolong it.
2. *Moisture and Warmth*, which accelerate and shorten it.
3. *Violent Muscular Action* (e.g., in convulsive deaths) accelerates and shortens it, as does any long debilitating disease.

Conditions which simulate rigor are :—

1. *Cadaveric Spasm.* This is an instantaneous spasm occurring at the moment of death, especially in states of great nervous tension. The whole body may stiffen, or only the fingers holding a weapon, as in suicide. This latter sign is the strongest presumptive evidence of suicide.
2. *Heat Stiffening.* In this there are contractures, which are absent in rigor. Rigor never sets in, and the stiffening persists until the muscles soften from putrefaction.
3. *Stiffening from Cold.* In this state rigor may set in when the body is thawed.

Hypostasis, Post-mortem Staining, or Cadaveric Lividity.—This condition is due to gravitation of blood into the dependent tissues and the dependent parts of organs, distention of their capillary vessels, and the escape of blood-stained fluid. The amount of staining depends on the amount and fluidity of the blood ; the distribution, on the position of the body and of pressure points on the skin ; and the colour, on the colour of the blood.

Staining starts very soon after death, and is very distinct in 12 hours. Its outline is always sharp. The colour is pinkish-blue changing to purple ; it is bright pink in carbon monoxide poisoning, light red in prussic acid poisoning, and reddish-brown to chocolate in methæmoglobinæmia, as from potassium chlorate poisoning.

During the first six hours the stains may change position if the body is moved. After this the blood clots and the staining is permanent. Of internal organs, the dependent parts of the lungs, stomach, and small intestine show the change well. Distinguishing it from disease are the dependent position of the stained part, the lack of staining in the non-dependent parts, and the absence of swelling or inflammatory exudation.

Hypostasis is intense in asphyxial deaths, and diminished when the blood is poor in quality—after hæmorrhage and in anæmias ; or if it rapidly coagulates—lobar pneumonia.

The differential diagnosis of hypostasis and bruising is discussed under DEATH FROM INJURY, p. 376.

Putrefaction.—Putrefaction is due to invasion of tissues by alimentary micro-organisms spreading in the blood, and is promoted by all conditions favouring bacterial growth. The factors modifying the onset and progress of putrefaction are :

1. *Temperature.* The change is phenomenally rapid in the tropics, but above 120° F. it ceases and mummification takes place. It ceases below 30° F. In England it is roughly twice as rapid in summer as in winter. It is rapid in heat-retaining fat bodies.
2. *Moisture.*—Drowning and dropsy make for rapid putrefaction. It is more rapid in naked bodies with free access of moving air than in clothed bodies in a still atmosphere. It is slow in bodies buried in deep graves or air-tight coffins.
3. *Blood in Tissues.*—Putrefaction is slow in bloodless tissues—for example, in the skin and subcutaneous tissues, under the rope in cases of hanging, and in dismembered limbs.

4. *Ante-mortem State.*—Putrefactive changes are slow in those dying with impoverished blood—anæmia, debility and wasting—and in cases of chronic metallic poisoning by, for example, arsenic, mercury, and antimony; it is, however, rapid in acute death from these substances. It is rapid in all acute toxic states, especially gastro-intestinal infection and peritonitis. While very slow in the new-born, it is more rapid if food has been given, or if the skin is broken.

Putrefaction first appears as a dusky reddening of the mucous membrane of the larynx and trachea, then of the stomach and intestine, the endocardium, and intima of the great vessels. With the change in colour the surface layers become easily detached and softened. Following this the parenchyma of the spleen, liver, and lungs softens and darkens, then the brain, kidneys, and heart. The bladder walls are next affected, and, often last of all, the uterus, provided it is unimpregnated: but if pregnant or recently delivered it softens very early. The early changes in the upper air-passages and stomach must be carefully distinguished from the effects of corrosives, and those in the organs from the effects of toxæmia.

Time of Onset.—The first external sign—a greenish discoloration of the skin over the cæcum—appears between the second and third days in summer, followed by general discoloration of the skin with formation of gas in 5 to 10 days. Gas formation causes skin blisters, distention of the chest and abdomen, forcing up of the diaphragm, and exudation of blood-stained froth from the mouth, with, perhaps, forcing up of stomach contents into the pharynx and thence into the air-passages. Putrefaction progresses as rapidly in one week in the air as it does in two weeks in water or six weeks if the body is buried (Casper).

Post-mortem Changes.—

First few hours: General muscular flaccidity. Muscles react to electricity and pupils dilate with atropine.

3 to 4 hours: Rigor mortis in masseter muscles and orbicularis palpebrarum.

8 hours: Rigor is general at summer temperature.

12 hours: Tension of eyeball lost. Body feels cold to the hand. Hypostasis is definite.

28 hours: Body has cooled to the temperature of the room in summer.

36 hours: Rigor is passing off in summer.

36 to 48 hours: Rigor is generalized in winter.

48 to 72 hours: Rigor begins to pass off in winter. Putrefaction starts in skin over the cæcum in summer.

7 to 10 days: General discoloration with evolution of gas.

Several months: Adipocere formation may be detected.

TECHNIQUE OF EXAMINATION IN SPECIAL CASES.

Poisons.—These may be: (1) Strong alimentary corrosives, causing death by burning and shock; (2) Milder corrosives, causing degenerative changes in the alimentary canal and viscera; (3) Non-corrosives, acting on the central nervous system or interfering with tissue respiration. Naked-eye changes, although occasionally specific, are not usually diagnostic, and a toxicological examination should be demanded whenever the signs are slight or equivocal, as they often are, or when the issues promise to be serious.

Technique of Examination.—Lay the abdomen freely open before severing the costal cartilages. Carefully collect any free fluid. Tie off the œsophagus and pylorus by double ligatures placed at some distance from each other and divide between them. Remove the stomach, then the small intestines in two parts, tying off the first two feet and then the ileum at the ileocæcal junction.

Remove the large intestine. Procure 6 wide-mouthed bottles or jars sufficiently large to take the contents (1) of the stomach, (2) of the upper half of the small intestine, (3) of the lower half, (4) of the large intestine, (5) of the bladder, and (6) any free fluid, in separate fractions. The stoppers should be of glass, not metal. If these are not at hand, jam jars may be used and the tops sealed by macintosh sheeting. Wash the bottles in running water for ten minutes, drain and dry them. Empty each fraction of the gastro-intestinal contents into a separate bottle. Close each bottle, test the stopper for leaks, and label with the date, name of deceased, and nature of specimen. Sign the label. Tie in the stopper with strong uncoloured string and seal it. When the specimens are delivered to the proper authority obtain a receipt for them.

In carrying out the rest of the examination avoid all contact of the organs with water, antiseptic, or other fluid. An important part of the investigation is a minute examination of the whole gastro-intestinal tract from the mouth to the anus, being careful to distinguish between the colour changes due to post-mortem hypostasis and active congestion.

For toxicological examination of the viscera remove the whole or at least half the liver, both kidneys, and the spleen. In a case of suspected narcotic poisoning, preserve the whole brain, the lungs, and remove at least 10 oz. of blood from the heart. In chronic poisoning by arsenic, antimony, etc., secure the shafts of both femora, and a quantity of hair and muscle. The organs should be packed in clean towels, then in macintosh sheeting, and sent in a large tin, being lightly packed with absorbent wool.

Take small slices of each organ about ¼ to ½ in. thick and about an inch in area, and place in formalin diluted ten times with water or normal saline. The rest of the organs should have neither water nor preservative added to them; if, however, preservative must be added for any special reason, this should be pure alcohol, and a sample of the alcohol should be sent with the specimens in a sealed bottle.

Bacteriological Examinations.—In the case of suspected blood infection the following specimens should be taken: (1) Blood from the superior longitudinal sinus and from one of the auricles; (2) Sample of spleen pulp and of red bone-marrow; (3) Some bile from the gall-bladder; (4) Pulp or tissue-juice from any enlarged glands, notably the retroperitoneal group in gastro-intestinal infection.

It is essential before puncturing an organ or opening a viscus that its surface should be thoroughly seared by a hot soldering iron, spatula, or some similar instrument. The specimens of blood are preferably taken into autoclaved 'Record' syringes. The tissue pulp is obtained by incising the seared area with a flamed scalpel, reducing the exposed organ to pulp with the point, and taking up the specimen with a flamed wide capillary pipette fitted with a teat. Deliver each specimen into a separate sterile tube.

Where no facilities exist for taking specimens, remove the spleen without incising the capsule, avoiding soiling it with blood or discharge, wrap in several layers of sterile gauze, or failing that a clean towel, then in a macintosh sheet, and dispatch at once, preferably in ice.

In gastro-intestinal infection of obscure origin take scrapings of any lesion of the mucous membrane after washing the surface in sterile water or saline. Dispatch the scrapings on a swab in a securely corked tube, together with the intact spleen and two or three intact mesenteric and retroperitoneal glands, selecting those which show swelling or discoloration. Swabs from the intestinal contents should also be taken.

In septicæmias secondary to wounds or septic foci, collect pus or discharge from the suspected primary focus and send intact any glands draining the lesion, More than one sample of such material should be sent when possible, and no antiseptic, fluid or otherwise, should be employed in sterilizing glassware or be used in the region of the infected focus. In obscure septicæmic deaths a careful scrutiny should be made of the hands and feet for infected punctured wounds, and the glands of the groins and axillæ dissected out and examined.

In deaths from fulminating infection the primary lesion is sometimes found in the lung before there has been time for the naked-eye signs of pneumonia to become manifest. In these cases lung juice taken through the seared pleura of the congested base should be sent for examination.

In cases of death where the infecting agent may be a filterable virus, as in fatal encephalitis following vaccinia or an acute specific fever, portions of the affected tissue should be sent for examination in 50 per cent glycerin.

Fulminating infection may occasionally cause death so rapidly that it is alleged to be 'sudden'. Both diphtheria and pneumonia have some tendency in this direction, as also have virulent streptococcal infections. The diagnosis in these cases is almost entirely dependent on bacteriological examination, and the success of the examination depends primarily on the care with which specimens are taken. Incomplete examination has undoubtedly been the cause of the death being returned as due to 'status lymphaticus' in many of these cases.

General Post-mortem Appearances in Septicæmia.—Some or all of the following changes are found: Transient rigor and early putrefaction; blood dark and fluid; rapid hypostasis; staining of intima of great vessels; lung bases engorged; organs opaque, friable, and swollen; spleen swollen and soft, and pulp semi-fluid; often petechial hæmorrhages into skin and serous membranes, and frequently serous or sero-purulent effusions into the serous sacs.

When the primary focus is not apparent, particular attention should be paid to punctured wounds of the limbs, joint injuries with suppuration, acute otitis media, and mastoiditis. Septicæmia with enlarged softened glands in the groin should raise the suspicion of bubonic plague. In cases of acute faucial angina of the Ludwig type, much of the redness and brawny swelling of the skin disappears after death, and this condition may easily be missed if the tonsils, pharynx, and neck organs are not examined.

Whenever the blood is definitely dark and fluid 12 to 24 hours after death, septicæmia is to be suspected, especially if asphyxia and poisoning can be excluded.

Death from Injury.—The following precautions should be taken:—

1. Dictate the notes while performing the examination.
2. Measure all injuries, never guess their size.
3. If there is any suspicion of serious issues, photograph all injured tissue or organs or draw diagrams, remove the organs if practicable, preserve in formalin, and pass through the Kaiserling process to bring back natural colours.
4. Always use a hand lens in examining wounds. Laceration and contusion of the scalp often has the appearance of an incised wound, but the lens will detect hair driven into the depths of the wound.
5. If more than one injury is present, decide which was the fatal injury, and estimate the time between the injury and death.
6. Complete the post-mortem examination even if mortal injuries are found.
7. Come to a decision on the following questions: (*a*) Were the wounds post mortem or ante mortem? (*b*) What was the type of weapon producing them? (*c*) If an interval existed between infliction of the wound and death, were speech or volitional acts possible in the interval? (*d*) Were the wounds homicidal, accidental, or suicidal?
8. Decide on the exact cause of death.

Distinction between Bruises and Post-mortem Staining.—These may be distinguished by the following characters :—

BRUISE	HYPOSTASIS
Due to localized traumatic or pathological rupture of vessels, an effusion of whole blood into the tissues, followed by clotting	Due to gravitation of blood and distention of capillaries in the subcutaneous tissue of dependent parts or of organs
Size depends on the laxity of the tissue, the sex, the state of nutrition, the presence or absence of disease of the blood or blood-vessels	Size depends on the amount and fluidity of the blood
Colour is that of whole blood, and changes as the blood hæmolyses in the tissues and its pigment dissociates, giving rise to characteristic colour zones in the subcutaneous tissues	Colour is that of blood or blood-clot. Any changes are due to putrefaction
Often elevated above the surface and the cuticle damaged over it	Not elevated
Position may be anywhere	Always in dependent parts
On incision the tissues are impregnated with firmly clotted blood which cannot be easily washed away, and little or no blood escapes from the divided vessels	Bloody fluid exudes from the vessels. Tissues are not impregnated. All blood present can be easily washed away

Recent bruises are red, quickly turning to purple, becoming greenish in about three days, and yellow in about ten.

Lacerated and Incised Wounds. Special note should be taken of the direction, depth, edges, and extremities of open wounds, whether there has been appreciable hæmorrhage or not, any evidence of inflammation and repair, and the presence of foreign bodies. The use of a hand lens is of considerable value.

Wounds inflicted during life are distinguished from post-mortem injuries by the following characters :—

ANTE-MORTEM WOUNDS	POST-MORTEM WOUNDS
Bleed freely. Formerly coagulated blood found in and about wound and infiltrating tissues. Blood is not washed away by gentle stream of water. May be marks of arterial spouting	May be slight bleeding from cut veins, but little coagulated blood present, and this easily washed away. Tissues not infiltrated
Edges of wound gape or are everted and soon become swollen. There are clots in the divided vessels	None of these appearances are present. The edges are usually in contact
In a few hours the parts of the clot in contact with healthy tissues are infiltrated with leucocytes. Later there will be signs of inflammation, ulceration, necrosis, or cicatrization	Absence of these signs

The following are the chief differences between lacerated and incised wounds :—

LACERATED WOUNDS	INCISED WOUNDS
Edges irregular and extremities torn	Clean-cut edges and extremities. Gape widely, especially if in transverse axis of body
Deep tissues unevenly divided	Deep tissues evenly divided
Surrounding tissue bruised	Much less marked
Bleeding relatively slight	Relatively copious

The nature of wounds should be carefully considered, as the legal penalty for wounds inflicted with a lethal weapon is usually greater than if the injury were inflicted with a non-lethal instrument.

Incised wounds become covered with lymph in 36 hours, and the edges are fairly strongly adherent in 3 days. If sepsis is present the margins swell in 8 to 12 hours; pus does not appear for 36 hours. Granulations fill the gap in about 5 days, and skin grows freely over the granulations in 14 days. Histological examination will provide somewhat more precise information.

Stab and Puncture Wounds. In these the depth is greater than the width, there is little free external hæmorrhage, and rapidly developing sepsis is frequent.

Suicide or Homicide.—In favour of suicide are wounds in the front of the body, incised wounds rather than contused or lacerated ones, incised wounds of the wrist or throat, punctured wounds over the heart, and gunshot wounds through the right temple, the mouth, or the heart. In favour of homicide are—a number of severe injuries, stab wounds of the back, wounds of the head, especially localized depressed fracture of the skull or more than one depressed fracture of the skull, and stab wounds of the abdomen, limbs, and trunk.

In cases of *cut throat*, the wound, if suicidal, extends from left to right, slopes downwards, crosses the neck at the level of the thyroid, and is deep on the left side, tailing off on the right; there are one or more tentative cuts at the left extremity, and the left carotid is usually severed. If homicidal, it is lower, runs horizontally, there is no tailing off, the slope of the cut is upwards, and the wound is more extensive.

Fracture of the Skull.—In investigating this injury use a saw only, and when the brain has been withdrawn remove the whole of the dura mater from the base with Spencer-Wells forceps. Fractures may be fissured, depressed, or comminuted. Fissured fractures start at the point of impact and are parallel to the direction of the force. If the skull is struck on the side with the head free to move, the fracture extends forward to the coronal suture and over the vertex, and deviates posteriorly to the opposite side. If the head is fixed, the fracture starts midway between the blow and the counter-pressure. If these points lie one on each side of the head, the fracture starts at the vertex or base and is parallel to the axis of compression.

Localized depressed fractures are usually due to heavy weapons with a small striking surface. The outer table is driven into the diploë, the inner table irregularly fractured, and a fragment of it often wounds the brain.

Comminuted fractures are due to weapons with a large striking surface, such as heavy sticks or iron bars. There is a longitudinal wide depression in which are bony fragments, and coarse fissures radiate from the main lesion.

Brain lesions from fractured skull may be on the same or opposite side. Contrecoup lesions are usually more severe than those directly under the seat of violence.

Injury of the Spine.—If due to direct violence, injury of the cord is likely. If the violence is indirect, there is likely to be compression fracture of the lumbar or dorsal vertebral bodies, and the cord may escape.

Cervical fracture may result from blows on the chin, forcing the head down on the sternum, or diving into shallow water. When there is complete rupture of the spinal cord above the 4th cervical vertebra, death takes place rapidly; when between the 5th cervical and 1st dorsal, there is paralysis of all four limbs, diaphragmatic respiration, and death in a few days. High cervical fracture is occasionally missed when not specially looked for.

Injury to the Ribs.—Fracture may result from direct or indirect violence. With indirect violence the ribs fractured are usually the 4th to the 8th; the fracture lies just in front of the angle, and is oblique from behind forwards; it may be double, the rib being fractured both at the angle and near the sternal junction.

Injuries from Firearms.—The questions likely to arise in connection with these wounds are: (1) The kind of weapon used; (2) The distance away; (3) The direction of fire: the relative position of victim and assailant; and (4) Whether accident, suicide, or murder.

In the case of *shot-guns* the discharge contains wad, gas, flame, and particles of unburnt powder. At a few inches the gas is driven in and lacerates and ruptures the tissue, the wad enters, and there is burning and blackening of the skin and wound. With smokeless powder there is less blackening and tattooing, and the marks are greyish. At a yard the charge of shot enters as one mass, producing a hole with irregular edges about an inch in diameter. The wad may enter. There is a zone of blackening, burning, and tattooing. At 2 to 3 yards there is a ragged hole with a few stray shot-holes around it, no blackening or burning, but some tattooing. At 4 yards shot enters individually or in small groups, and the pattern is 6 to 8 in. in diameter. At 10 yards the pattern of dispersion is 20 in. across. With short weapons (pistols) there is rapid dispersion.

In the case of *revolvers* the bullet is of soft lead with a relatively low muzzle velocity—that of the service Webley is 640 feet per second. If the weapon is in contact, the entrance wound is torn and cruciform, with slight burning and a zone of blackening ½ in. wide; the exit hole is smaller than the entrance hole and about the size of the bullet. At 6 to 12 in. there is no tearing; the entrance is a rounded hole with a bruised margin and a peripheral zone of blackening and powder particles; the exit hole is larger than the entrance, and is usually torn. At 2 to 3 feet there are no powder marks.

Wounds from *rifle bullets* have a high muzzle velocity. That of the service rifle is 2000 to 3000 feet per second. If a through-and-through wound and no bony injury is produced, the entrance and exit holes are the same size. The entrance wound presents an appearance as if a lead pencil had been forced into the tissues; the edges are depressed, and surrounded by a reddish zone which on drying becomes brown. There is much bruising in the track of the bullet. If this strikes bone at 200 yards or less there is great shattering and comminution, and the exit wound is lacerated and may be as large as the palm of the hand.

At short ranges of a few centimetres the entrance wound is larger than the exit, as the gases of discharge enter with the projectile, and, expanding in the tissues, burst them. If the rifle is a few inches away, the exit wound is either larger than or equal in size to the entrance wound, unless bone is struck, when it is always larger. The edges of the entrance wound are inverted, of the exit everted; the clothes are turned in at the entrance and out at the exit. At 800 to 1000 yards much of the initial velocity is lost and clean entrance and exit wounds result. Beyond this it becomes a low-velocity bullet.

THE INVESTIGATION OF SUDDEN DEATH.

Death may be sudden or unexpected enough to raise suspicion under the following conditions: (1) In the subjects of *unsuspected chronic disease*; (2) When occurring during the early hours of an *acute fulminating infection* or in acute and unsuspected diseases of the blood; (3) When due to *accidental asphyxia*; (4) In cases of *shock or inhibition* following trivial injury; (5) In *pulmonary or cerebral thrombosis* or similar vascular accidents; (6) Following *injury without external signs*, as in high fractures of the cervical spine.

1. **Death from Unsuspected Chronic Disease.**—In this group death is often accelerated by fright, increased or sudden exertion, or slight degrees of violence. The inquiry may be prompted by a history of quarrelling. The following conditions may be found:—

a. Sudden Partial Occlusion of the Coronary Circulation.—In young adults and early middle age the cause is commonly an occlusion of the left vessel at its origin by the scarring resulting from syphilitic mesaortitis, or more rarely by the vegetations of acute aortic endocarditis. In older subjects high-grade atheroma of the first inch of the descending branch of the left coronary artery is frequently found. With this there is either old-standing fibrosis of the interventricular septum and left ventricular wall, or recent thrombosis in the atheromatous vessel, with acute swelling, œdema, and congestion, or an irregular yellow area of infarcted muscle in the territory of the vessel.

b. Chronic Myocardial Disease.—This may be: (i) *Fibro-fatty degeneration* from arteriosclerosis of the smaller coronary vessels; (ii) *The chronic degeneration found in hypertrophied hearts* with recent acute dilatation, resulting from rheumatic and syphilitic infection, often with aortic valvular disease, or as found in Graves' disease or toxic adenoma of the thyroid; (iii) *Extensive fatty infiltration* of the heart walls, especially on the right side, usually found with general obesity, fairly frequently in chronic alcoholism, but occasionally met with in people of spare build.

c. Rupture of a Thoracic Aneurysm.—The small aneurysms of the sinuses of Valsalva are liable to be symptomless, and often cause sudden death from intrapericardial rupture. Sudden hæmorrhage into the pericardial sac from any cause, even if the quantity is small, usually causes sudden death.

d. Cardiac Displacement from Large Quiescent Pleural Effusion.

e. Goitre with Thyrotoxicosis.

2. **Death from Acute Fulminating Infection.**—The following may be found:—

a. Unsuspected Acute Bronchiolitis and Pneumonia is liable to occur during epidemics of influenza, especially in ambulatory cases, after exposure or acute alcoholism.

b. Acute Myocarditis, often with early pericarditis at the base of the heart, occurs in the acute specific fevers, and is occasionally seen in children and adolescents as a result of rheumatic infection without joint symptoms and with a manifest period of invasion of a few hours only.

c. Cases of Fulminating Acute Specific Fevers—e.g., scarlet fever and diphtheria and the septicæmic stage of meningococcal infection. Some of these cases show hæmorrhage into the suprarenals, which may be extensive, or only obvious on cutting open the organ.

d. Acute Hæmorrhagic Pancreatitis.

e. Acute Faucial Angina of the Ludwig type, usually streptococcal.

3. **Death from Asphyxia.**—This may be accidental when foreign bodies, food, vomit, or pus are aspirated during unconsciousness from acute alcoholism or other cause, from laryngeal anæsthesia as in diphtheritic palsy, or from laryngeal paralysis in bulbar palsy. It may be due to the acute œdema of

streptococcal angina or virulent scarlet fever, or to the action of irritant gases, steam, corrosive poisons, or inhalation of the fumes of strong acid. Pressure on the air-passages by a retrosternal goitre or a mediastinal new growth or abscess is likely to have given previous warning of its presence. Asphyxia from carbon dioxide poisoning may present difficulties, but there are usually clear confirmatory signs of carbon monoxide poisoning.

The general signs of death from asphyxia are--extensive and rapid hypostasis with delayed cooling, cyanosis of the face, and prominence of the eyes, perhaps with subconjunctival petechial hæmorrhages. The blood is dark and noticeably fluid; the right heart and great veins are distended, the left usually empty and contracted. The engorged lungs exude blood and serous fluid on section, and there are usually subpericardial and subendocardial hæmorrhages, especially in arteriosclerotics.

In cases of *strangulation by the hand*, there will be suspiciously placed and extensive bruising of the skin and muscles of the neck, and submucous hæmorrhages into the mucous membrane of the larynx and epiglottis. There is likely to be fracture of the hyoid bone and laryngeal cartilages; the joints between the body of the former and its great horns ossify after middle age and the bone then becomes more easily fractured.

The only specific sign of death from suicidal and homicidal *hanging* is the mark of the ligature around the neck, but in these cases death is very considerably hastened by cerebral anæmia. If the ligature is tight the body below it shows marked hypostasis, the face remaining pale. It is important to remember that death may easily result whilst the feet are still on the ground.

In death from *drowning*, hypostasis is most marked in the head and neck, as the feet float upwards. There is a very fine froth at the lips, which, when wiped away, reappears on compressing the chest. Weed or gravel grasped in the hand by cadaveric spasm affords strong proof that the body was alive when immersed. The lungs are strikingly voluminous, and bulge out of the opened thorax; they feel sodden, pit on pressure, are indented by the ribs, and are definitely paler than in other forms of asphyxia: on section, large volumes of watery fluid and froth exude from the cut surface: the air-passages are filled by fine froth. The stomach contains water and sand or mud. In death occurring immediately from the shock of immersion, or in murdered bodies thrown into water, the signs of drowning are absent.

4. **Death from Shock or Inhibition.**--This is rare in the absence of acute infection, manifest chronic disease, or some clear derangement of the ductless glands such as Graves' disease, acromegaly, or abnormal pregnancy. When it is proved that a well-defined endocrine disorder is associated with abnormalities of the thymus gland, 'status lymphaticus' may be accepted as the true cause of death in some of these cases. Until then it cannot be considered as a scientific pathological diagnosis, as so many of these cases prove on full investigation to be suffering from acute bacterial infections.

Shock-like deaths may follow blows on the abdomen or the external genitals, the severe pain of renal and biliary colic, passing a catheter or sound, or the injection of fluids into the vagina or uterus. Equally sudden death may follow exploration of the pleural, pericardial, or peritoneal sacs by needles, or, if there is increased intracranial tension, it may occur after lumbar puncture.

Rapid death with acute asphyxial symptoms is an extremely rare sequel of anaphylactic shock.

5. **Death from Pulmonary or Cerebral Thrombosis.**--

Pulmonary Thrombosis.--A history of a sudden attack of urgent dyspnœa, lasting from half a minute to half an hour, and terminating fatally with either pallor or cyanosis, is usually to be obtained. In 80 per cent of cases the fatal thrombosis is embolic, due to detachment of a thrombus originating in the lesser circulation or the systemic veins, especially those of the lower limbs when varicose, or those of the hæmorrhoidal, vaginal, uterine, or prostatic plexus. This primary thrombosis may be traumatic or post-operative, usually occurs between the 6th and 16th day after the injury, and there is generally a shorter or longer period of confinement to bed. Pulmonary thrombosis, not necessarily fatal, complicates about 1 per cent of all laparotomies. One important variety occurs spontaneously in recently delivered women.

A modification of the usual technique is necessary to diagnose and demonstrate the condition. The pulmonary artery should be opened up *in situ* before the thoracic organs are removed. The incision is carried into the right ventricle and outwards into the main vessels on each side. The vessel will be found distended with a *coiled* clot in some part of its course. The lung supplied by the vessel may show acute hæmorrhagic congestion, or in very rapidly fatal cases comparatively little may be seen. Beyond the occluded vessel, which may be the main trunk or a large or smaller branch, all the tributaries will be distended with propagated clot. At the point of impaction, if the clot be carefully lifted out of the vessel, a varying length of it will be found coiled closely on itself. When straightened out the diameter of this is usually less than the diameter of the vessel i.e., it has arisen in a smaller vessel and it obstructs a larger one because of its shape. While this is true of thrombi derived from the peripheral veins, the coiling of the clot is less obvious if the thrombus arises in the lesser circuit. Some part of the clot at the point of impaction will have some of the characters of an ante-mortem thrombus (*see below*). A search for the primary site of thrombosis should next be made. Examine the pulmonary arteries for arteriosclerosis, which occasionally complicates chronic fibrosis of the lungs, and the tricuspid valves for vegetations. Open up the inferior vena cava in its whole course by splitting the liver and removing the intestines, and carry the incision into the iliacs, the veins of the pelvis, and those of the lower limbs. If no cause is apparent, open up the superior vena cava into the dural sinuses. At the site of primary thrombosis what remains of the parent thrombus will be found.

In deciding whether clotting took place before or after death, the following characters should be looked for:

ANTE-MORTEM THROMBUS	POST-MORTEM CLOT
Is comparatively dry, granular, brittle, and friable	Is wet, gelatinous, slippery, tough, and elastic
Some part of it is clearly and finely laminated or there is definite indication of lamination	Is homogeneous or irregularly and coarsely layered, never finely laminated
There will be evidence of:— *a*. Incorporation of the thrombus with the vessel wall, i.e., adhesion *b*. Hæmolysis (discoloration) or autolysis (softening)	Adhesion, discoloration, and softening are all absent
Some part of the thrombus will be ashy grey, other parts will show transitions in colour between brown and grey	Clot is either yellowish, reddish-yellow, or red

The clot found in the pulmonary vessel is largely consecutive or propagated, and the major part of the obstructing clot is of very recent formation: but

at some point a larger or smaller portion will be found to have some adhesion to the vessel, and to be dryish, friable, and perhaps grey. Tight distention of a pulmonary artery or branch by this so-called agonal clot is sufficient for the diagnosis.

Cerebral Thrombosis.— This condition may cause death rapidly enough to raise suspicion in cases of unsuspected neurosyphilis, in recently delivered women, and in the more chronic varieties of subacute bacterial endocarditis. When the search for a primary focus of thrombosis is fruitless, the carotid artery should be opened up in its course through the bony base of the skull, where an aneurysm may be discovered. Marked distention of the bladder not due to mechanical obstruction should suggest a close examination of the central nervous system.

PREGNANCY. ABORTION. INFANTICIDE.

The Breast. The organ should be incised from its deep surface. When quiescent and non-lactating, the body of the gland is white and the stroma firm; a few acini are seen as occasional greyish-red or brownish points; there is much fat. In the mid months of pregnancy it is softer and the stroma is œdematous; the acini are larger and more numerous; opalescent fluid can be expressed from the nipple. During lactation, greyish-red and brown acini form the bulk of the gland, and the section looks reddish-brown and granular; glairy or milky fluid exudes from the cut surface on compression of the organ. In old age the glandular substance atrophies and is replaced by fat.

The Uterus.—The following table gives the characters of a nulliparous uterus and one that has been pregnant:—

	ADULT NULLIPAROUS UTERUS	ADULT UTERUS WHICH HAS BEEN PAROUS
Weight	2 to 2¼ oz.	4 oz.
Contour of body	Triangular; fundus almost level with a line joining the uterine ends of the tubes	Globular; fundus rises higher
External os ..	Circular; very slightly elongated; not fissured	Transverse; irregular or fissured; projects into vagina
Cervical canal ..	Nearly as long as cavity of uterus; narrow; well-marked arbor vitæ	Shorter; wider; smoother; arbor vitæ cannot be made out
Cavity of uterus..	Narrow and short; walls bulge inwards	Wider and longer; no convexity inwards

During menstruation the whole organ is slightly swollen; the mucous membrane is uniformly tumid and dark red; there is some pouting of the external os, which becomes patulous: there may be menstrual discharge in the cavity.

Early abortion can be distinguished by the presence of a placental site, which becomes apparent at the third week, by the more obvious enlargement, but more certainly by histological examination of the contents of the uterus and the demonstration of chorionic tissue. All signs of early abortion disappear in 3 to 4 weeks.

The uterus shortly after childbirth has a thick and short cervix whose lips are everted. The body is a large flattened sac with walls ¾ to ½ in. thick; the cavity is pear-shaped, measuring 9 to 12 in. immediately after full-term delivery, and 7 in. two days afterwards. The placental site appears as a reddish-purple area in which thrombosed sinuses can be seen. The interior of the cervix is ecchymotic and purple; the internal os cannot be made out; the cervical canal is smooth. Except for the placental site, the interior of the uterus is lined by shaggy reddish decidua coated with lochia. The internal os is distinguishable in 14 days. The endometrium is regenerated by the fourth week, but the placental site remains discoloured for 4 to 5 weeks. The cervix is normal in 6 weeks except for lacerations. Complete involution takes about two months.

Care must be taken not to interpret the normally shreddy decidua as evidence of sepsis. Puerperal sepsis due to virulent infection may be fatal in so short a time that little alteration is produced in the above appearances. In these cases cultures should be taken. Usually there is sloughing of any vulval, vaginal, or cervical lacerations. The myometrium is œdematous and perhaps gangrenous; it is usually exposed by large or small areas of frank ulceration. Most of the changes are at the placental site. Fragments of placenta may be still adherent. The thrombosed sinuses are obscured as they lie in inflamed granulations, or the whole site may be purulent. There is often brawny œdema, with a serous or sero-purulent discharge, of the broad ligaments and pelvic cellular tissue.

Investigation of Cases of Abortion.—The genito-urinary organs and vulva, with the rectum, should be removed entire after examining for external signs in the lithotomy position. After a careful search for injury and a complete note has been made, the specimen should be put through the Kaiserling process and preserved.

As ecchymoses and bruising may occur naturally and natural abortion is an extremely common happening, it is wise to subject any suspected lacerations or supposed injury to histological examination. Sections of the uterine contents, to discover if chorionic tissue is present, should also be made. Actual rupture of the uterus during early pregnancy is unknown, and does not occur later unless the muscle is thin and the organ underdeveloped or there is some pathological change in the walls.

Infanticide.—Definite opinions will be required on the following points:—

1. The maturity of the child.
2. Did the child breathe and to what extent?
3. Was it born alive? If so, was it given proper attention?
4. How long did it survive its birth?
5. How long has it been dead?
6. The cause of death.
7. Was death natural, accidental, or homicidal?

External Examination.—Notes should be made regarding:—

a. Attention at birth. Has the body been washed? Is the cord cut or torn or tied? Is there any reaction in the stump? Is vernix present? Are there remains of it in the armpits?

b. Site and extent of the caput, and any moulding. Careful examination of the mouth and lips and of the body for bruises and punctured or lacerated wounds.

c. The weight and length.

d. Age. Examine the os calcis, astragalus, cuboid, and the lower end of the femur for ossific centres. The centres appear in these bones at the twentieth to twenty-fourth, the twenty-sixth to the thirtieth, the fortieth, and the thirty-fifth weeks respectively.

Internal Examination.—Make the usual incision from the chin downwards, but two inches above the umbilicus carry it outwards on each side to the anterior superior iliac spines. Make the left incision first, so that the umbilical vein may be inspected, traced to the liver, and examined for sepsis. In the triangular flap turned down the urachus and umbilical arteries can be examined.

Take the height of the diaphragm by passing the finger into the dome on each side and marking the position of its tip externally. After full inspiration it is depressed to the 5th or 6th rib on the right side and to the 6th rib or space on the left. If the lungs are only partially inflated or airless the dome reaches to the 4th rib.

Divide the lower jaw at the symphysis menti and retract the two halves. Carefully inspect and remove the contents of the mouth and pharynx and keep for microscopic examination. Note the position of the tongue. Dissect out the trachea just above the suprasternal notch and ligature it, with the œsophagus. Remove the sternum in the usual way.

Note whether the lungs are visible and whether they overlap the heart.

Divide the trachea and œsophagus above the ligature. Remove the tongue, larynx, and trachea in one piece, and the thoracic organs in another. Examine the contents of the trachea and œsophagus as far as the ligature. Open up the trachea and main bronchi. Divide each lung into its lobes, and test by floating in water. Each part that floats is then cut into several small pieces and each piece tested. Take several floating fragments, wrap in a piece of cloth, and by twisting the two ends disintegrate them. Test the fragments for buoyancy. Reserve a few pieces of lung for histological examination. Tie off the stomach by double ligatures at the pylorus, and remove it; test its buoyancy. Test the duodenum and small bowel in the same way. Open the stomach and carefully examine the contents, especially for food. Confirm any naked-eye findings microscopically, special note being made of fat.

The interpretation of the findings is shown in the following table:—

	NO RESPIRATION	PARTIAL RESPIRATION	FULL RESPIRATION
Lungs:—			
Size and position	Small; lie against spine; almost hidden by heart	Larger	Fill the thorax and partly cover the heart
Edges	Sharp	May be rounded irregularly	Rounded
Colour	Uniformly purple; no trace of marbling	Variable number of raised red angular areas of aeration	Mottled all over by areas of light and darker red
Consistence	Solid	May crepitate in raised areas	Crepitate
Section	A little dark blood escapes	Variable	Bright red blood and froth escape
Section examined with hand lens	Uniformly solid	Distended air cells may be seen in red areas	Distended air cells clearly visible
Flotation test	Every part sinks	Some parts sink: others float	The smallest pieces float even after disintegration
Air-tubes	Free from froth	May be froth	Contain fine froth
Stomach:—			
(If putrefaction absent no artificial aeration practised)	Sinks: contents, mucus	Probably sinks	Floats, and may contain food

POST-OPERATIVE FEVER IN CHILDREN. *John Fraser, Ch.M., F.R.C.S.Ed.*

What is described as a "quick, generally fatal complication following operation on infants" is discussed by Endre Makai,[1] of the Children's Hospital, Budapest. Records of three cases affected by this complication are given, in two of which a fatal issue ensued. The cases were (1) a boy ten months old, operated on for inguinal hernia, (2) a girl two years and four months old, operated on for cleft palate, and (3) a boy four months old, operated on for hare-lip. In each case the sequence of events was very similar. A rapid rise of temperature appeared on the afternoon of the day of operation or on the following day, it was unaffected by antipyretics or cold packs, and persisted over a period varying from six to sixteen hours. The pulse became so quick as to be almost uncountable; the respirations at first were deep, but later became superficial and extremely rapid. Where the temperature fell, improvement gradually set in and the crisis passed, but in the majority of cases death occurred during the pyrexia period. In all the cases fits occurred- in one instance it was a general eclamptic seizure, in the others it was a local spasmophilia affecting the muscles of the face and hands.

In the two cases in which post-mortem examination was carried out the findings were very much alike; there was hyperæmia of the brain and membranes, degenerative changes in the heart muscle, congestion of the mucous surface, and evidence of thymus enlargement. In no case was there any suggestion of sepsis.

Various explanations of this distressing complication have been put forward. The author of this paper draws attention to the similarity between this condition and snake-bite, and, pursuing the parallel, is inclined to suspect that tissue destruction in association with the surgical wound, and the consequent liberation of toxic products of a proteose nature, in an individual peculiarly sensitive to such influence, are responsible for the disorder.

The paper contains no suggestions on the matter of treatment.

Reference [1] *Münch med. Woch* 1928, March 23, 511.

POST-PARTUM HÆMORRHAGE. (*See* Labour and its Complications.)

POTT'S DISEASE. (*See* Tuberculosis of Bones and Joints; Spine, Tuberculosis of.)

PRE- AND POST-OPERATIVE TREATMENT.

Sir W. I. de C. Wheeler, F.R.C.S.I.

In recent years attention has been called to the paramount importance of careful and systematic pre-operative and post-operative treatment. The technique of operations has become so standardized that, to obtain improved results, care before and after operation, combined with judgement and experience, are more important than artistic skill. The results more than justify the additional labour involved. For many years the Medical Annual has stressed these points.

Purgation and Starvation.—Modern pre-operative treatment forbids purgation and starvation. It is well to keep the patient in bed for two or three days before operation so that he may become accustomed to the new surroundings, get acquainted with his nurses, reduce smoking, moderate the diet, and so forth. The bowels should be encouraged to act, but not excessively. One or two simple pills of aloin, belladonna, and strychnine, followed by a small dose of salts, and occasionally an enema, is sufficient; they should not be given the night preceding operation. On no account should drastic purgatives be employed. Calomel and castor oil are too irritating, and should not be used as part of the pre-operative treatment or immediately following operation.

W. E. M. Mitchell,[1] in reference to castor oil, says the intestine is empty and collapsed after such treatment, but it is not in the best condition to withstand the mechanical interference of the surgeon. "The gut is irritated, reddened, swollen, and exhausted by the insult. Such irritation leaves it in a condition most unsuitable for intestinal surgery." Furthermore, there is marked inertia of the intestinal musculature following castor oil, which may be a cause of ileus after abdominal operations. Pre-operative starvation is likewise to be avoided. Every operation is attended with some shock and the lowering of the alkali reserve in the blood. If this is combined with starvation, acidosis will result, especially in children. A combination of pre-operative purgation and starvation in a septic case, combined with the administration of chloroform, is courting disaster. Shock, post-operative vomiting, and acidosis, especially in children, are almost certain to follow. Too much emphasis cannot be laid on the importance of a clean mouth before a general anæsthetic. Mitchell reiterates the old recognized teaching, which is, however, too often ignored. The risk from the anæsthetic is materially increased when it is administered through a cavity in which virulent pathogenic organisms abound. [The closed ether inhaler has been to a large extent abandoned; if used in hospital the most thorough sterilization of the entire apparatus is essential.—W. I. de C. W.]

Administration of Glucose.—It is the practice of the reviewer (MEDICAL ANNUAL, 1928, pp. 357, 358; and 1927, p. 402) to administer **Glucose** in large quantities for two or three days before operation in all serious cases. The glycogen reserve in the liver is restored, the tendency to acidosis is lessened; the heart muscle is stimulated, and diuresis is invoked. Usually glucose is administered by the mouth in the form of barley sugar or fruit, and in 5 to 10 per cent solutions, but in more acute cases intravenous medication is adopted, sometimes with the addition of **Insulin.** Notwithstanding all precautions, unexpected rigors sometimes follow the intravenous injection. Glucose is frequently administered by the rectum, but it is doubtful if there is any appreciable absorption by this route.

D. Levi[2] appears to prove that the rectum and colon vary in their power of absorbing glucose in different subjects, and that on the whole very little sugar can be introduced by this route. From a practical point of view, rectal glucose appears to be of little value in maintaining body nutrition. Finally, he thinks that in individuals suffering from post-operative shock there is a state of hyperglycæmia. For this reason he suggests that the rational treatment of post-operative shock would be the administration of insulin.

Pulmonary Embolism.—In previous issues of the MEDICAL ANNUAL it has been pointed out that, of all post-operative tragedies, pulmonary embolism is the worst. Walters[3] reminds us once again that not only the circulation of the blood but the function of all the organs of the body becomes sluggish as the result of enforced rest in bed. In order to combat the depression of metabolism, the decrease in blood-pressure, and the slowing of circulation, he recommends the administration of **Thyroid Extract** in 2-gr. doses three times daily after operation, usually commencing on the third or fourth day, until the patient is allowed out of bed. If elevation of pulse-rate and temperature occur to too marked a degree, it is discontinued. In 2000 cases in which thyroid was administered and the patients urged to move about in bed from side to side, no pulmonary embolism occurred. Plummer observes that in cases of severe cardiac decompensation complicating hyperfunctioning thyroids thrombosis and embolism practically never occur. There is also experimental evidence in favour of Walters's effort to overcome post-operative thrombosis and embolism by increasing the metabolic rate, following the use of tablets of desiccated thyroid gland. (*See also* LUNG, EMBOLISM OF.)

Shock.—P. A. Wade[4] advocates the **Dextrose-Insulin** treatment of shock. His technique is as follows: In the surgical service there is on hand at all times a solution of dextrose especially prepared for administration by vein or under the skin. Immediately on admission, patients with traumatic shock are given

1000 c.c. of 5 or 10 per cent dextrose solution intravenously. The infusion is allowed to run into the vein slowly, so that the whole amount is administered over a period of one hour. Insulin is given at the rate of 1 unit (U-20) to 3 grm. of dextrose, subcutaneously. The total amount of insulin is given in two equally divided doses, one fifteen minutes after the beginning of the infusion and the second at the end of the infusion.

Clinical improvement is noted during the administration of the treatment, the blood-pressure and the pulse-rate being recorded at the beginning and at the end of the infusion. The solution is kept at the required temperature (110° F.) throughout the infusion, and the patient is watched carefully for reaction of any kind. No ill effects from the use of insulin have been experienced. Although it is sometimes difficult to secure specimens of urine at the required times, most of the patients have shown traces of sugar, or more than traces, in the urine following the infusion, indicating that the amount of insulin used is not in excess. It has been found in patients suffering from a severe infection that more insulin is needed to take care of the injected sugar, and in this series some patients of this type were given 1 unit of insulin for every 2 grm. of dextrose without ill effects, and with traces of sugar in the urine following the treatment.

Summarizing, the author says: (1) The use of dextrose intravenously with insulin subcutaneously in the treatment of shock gives results which seem more satisfactory than those obtained in cases treated by saline or dextrose solution alone. (2) Cases of traumatic shock treated early respond most readily to this treatment. (3) Cases of post-operative shock treated in this manner show marked improvement. (4) The optimal dosage is 1000 c.c. of 5 or 10 per cent dextrose with 1 unit of insulin to 3 grm. of dextrose; beneficial results are usually apparent after 800 c.c. of fluid have been injected. (5) Cases of shock in which the blood-pressure is decreasing toward the 'critical level' (80 to 90) should be treated immediately before the rapid fall which usually follows, with symptoms of severe shock.

Skin Sterilization.—In a review of therapeutic progress, the *Prescriber*[5] states that, notwithstanding the routine employment of the usual methods for skin sterilization, quite a large percentage of infections—some fatal—have occurred. The work of Tinker and Sutton[6] is quoted. Strips of rubber gloves were dipped into cultures of the organism to be tested, and after the culture had dried the strip was immersed in the antiseptic solution, which was also allowed to dry *in situ*. It was thought that if the antiseptic did not kill bacteria under such conditions, little could be expected of it when used on the skin. Such a study of over 1500 cultures demonstrated that iodine, Harrington's solution, mercurochrome, and potassium mercuric iodide will not kill most of the resistant, nor some of the less resistant, pathogenic bacteria. The fact that an antiseptic kills one variety of bacterium, even a resistant one, does not prove that it will kill all. The aniline dyes seem to deserve further investigation.

In a later article, Tinker and Sutton give some details regarding **Acriflavine** in skin disinfection. Special attention is drawn to the following points: (1) Thorough mechanical cleansing of the skin with soap and water is imperative; (2) Liberal use of alcohol and ether or other efficient fat solvents with gauze and friction is necessary to remove all sebaceous secretion from the skin; (3) The last gauze sponge used before the application of acriflavine should come away from the skin without discoloration, thus giving evidence of a thorough mechanical cleansing; (4) A 5 per cent solution of acriflavine, freshly prepared, must be used; (5) In washing or cleansing the skin and in painting with acriflavine one should work away from the centre of the field to the periphery;

(6) Acriflavine painted on the skin must be left, not washed away with alcohol as is done with iodine.

Post-operative Suppurative Parotitis. W. H. Fisher[7] quotes some cases of this post-operative complication. In the first case, parotitis was noted on the third day after gastro-enterostomy. The second case followed appendicitis and tonsillitis, and in the third case the infiltration of the gland occurred on the second day following a gynæcological operation. Fisher thinks that the infection is nearly always staphylococcic, and he recommends the intravenous administration of **Mercurochrome** in conjunction with proper post-operative care. Daily intravenous administrations of mercurochrome will check or hold in abeyance the progress of the infection after the second or third dose. If there is no improvement, surgical procedures should be adopted immediately. In the gangrenous type, although all reports invariably show a fatality, mercurochrome should be tried with early incision and drainage. In the three cases referred to, 5 c.c. of mercurochrome were given intravenously for from three to six days. [The reviewer has used mercurochrome in a few cases of infection, but feels that it should only be used intravenously if emergency demands it. In the Mayo Clinics the routine dose was 20 c.c. of a 1 per cent solution.[8] It is said to be uniformly germicidal, and especially so against *B. coli.*—W. I. de C. W.]

REFERENCES. [1]*Lancet*, 1927, ii, 270 ; [2]*Brit. Jour Surg.* 1927, Oct., 282 ; [3]*Surg. Gynecol. and Obst.* 1927, Aug., 238 ; [4]*Jour Amer. Med. Assoc.* 1928, June, 1859 ; [5]*Prescriber*, 1927, July, 245 ; [6]*Jour. Amer. Med. Assoc.* 1926, ii, 1347 ; [7]*Ann. of Surg.* 1927, Sept., 445 ; [8]*Collected Papers of the Mayo Clinic*, 1925, 333.

PREGNANCY IN HEART DISEASE. (*See* HEART DISEASE.)

PREGNANCY, TOXÆMIA OF : ECLAMPSIA.

Beckwith Whitehouse, M.S., F.R.C.S.

Consideration of recent work on the causation of eclampsia, and especially of the clinical and biochemical study of the toxæmias of pregnancy, published by J. N. Cruickshank, J. Hewitt, and Couper,[1] shows that we are still far from having reached any satisfactory explanation, and more research is required before definite conclusions can be reached as to the etiology of this condition. Cruickshank's report is based upon 200 cases of pregnancy toxæmia and a controlled series of 42 normal cases from the research department of the Glasgow Royal Maternity and Women's Hospital The incidence of eclampsia among 23,630 patients varied from 6·1 per cent to 2·8 per cent, and the average maternal death-rate was 22·4 per cent. Stillbirth was three times as frequent in eclamptic cases, and the death-rate among the infants of eclamptic mothers was more than three times the general infantile death-rate of the hospital. The results of liver function tests have been disappointing, and the authors conclude that none is of any real service in the diagnosis or prognosis of pregnancy toxæmia. They do not agree with Berkeley, Dodds, and Walker that the results of an investigation of hepatic function may be used as an indication for the termination of pregnancy in cases of albuminuria ; and, in fact, consider that there exists as yet no sufficiently sensitive method of estimating the function of the liver. Blood analyses presented great individual variation, but the normal peculiarities are commonly exaggerated in all forms of toxæmia during the later months of pregnancy. Moderate nitrogen retention is common in severe eclampsia. There is also no relationship between the chloride content of the blood or urine and the œdema which develops in some cases. Cruickshank and his associates cannot adduce any evidence that toxæmia is caused by disturbance of the endocrine glands, or that it is due to any animal or vegetable parasite. They think, on the other hand, that the cause is to be found in some substances produced by protein catabolism of placental origin. It is known that the breakdown products of lecithin have a powerful action even in small amounts, and it is possible that histamine may be an etiological factor in the causation of eclampsia, as recently suggested by various American investigators. True eclampsia does not occur spontaneously in animals, although convulsions have been produced by experimental injection of placental tissue extracts.

From a practical standpoint the incidence of eclampsia can be markedly diminished by rigid adherence to a **Water Diet** and **Absolute Rest in Bed** whenever, during pregnancy, the earliest signs of toxæmia manifest themselves. The value of this prophylactic treatment is evident in the annual reports of practically all maternity hospitals and extern clinics. No greater testimony to methodical ante-natal care can be found than by a study of the incidence of eclampsia in the figures of these institutions.

REFERENCE.—[1]*Medical Research Council's Special Report Series*, No. 117, London, H.M. Stationery Office, 1927.

PSYCHOPATHOLOGY AND PSYCHOTHERAPY. (*See* MENTAL DISEASES.)

PUERPERAL FEVER, PUERPERAL PYREXIA, AND OPHTHALMIA NEONATORUM REGULATIONS.

Joseph Priestley, B.A., M.D., D.P.H.

Amending regulations came into force on July 1, 1928, by which the Public Health (Notification of Puerperal Fever and Puerperal Pyrexia) Regulations, 1926, and the Public Health (Ophthalmia Neonatorum) Regulations, 1926, are amended in respect of the destination of the necessary notifications. In regard to puerperal fever and puerperal pyrexia, practitioners must notify the medical officers of health of the districts in which they are attending the infected women. In the case of London hospital cases of puerperal pyrexia, the address from which the patient came, and the date of admission to hospital, must be given, and the notifications sent to the medical officers of health of such districts in which such addresses are situated. The same applies to ophthalmia neonatorum cases, together with the same variation in regard to London hospital cases.

PULMONARY ASBESTOSIS.

W. H. Wynn, M.D., F.R.C.P.

It has been known that workers exposed to asbestos dust were liable to suffer from pulmonary troubles, but the actual pathological changes have only recently been studied. The first recorded case was that of a man, age 33, who died in Charing Cross Hospital, under the care of the late H. Montague Murray. He had worked in an asbestos factory for ten years, and was the sole survivor of ten men who started work with him. At the post-mortem examination pulmonary fibrosis was found, and microscopic sections showed "spicules of asbestos". W. E. Cooke[1] has reported a second case, a woman of 33, who commenced work in an asbestos factory at 13 and soon developed a cough. Signs of fibrosis slowly developed and she was obliged to cease work at the age of 31 after some years of intermittent attendance. Signs of extensive cavitation developed, and she died at the age of 33. Stuart McDonald[2] has reported upon the histology of the lungs in this case. F. W. Simson[3] has studied the histology of lungs from four cases from an asbestos mine in Southern Rhodesia.

Asbestos is a silicate, and there are numerous varieties. It is found in association with other minerals, especially with chrome iron and magnetite. The mining of the mineral is not a great source of danger, as it is mined in open quarries, but a considerable amount of dust is formed during crushing of the rock, in spinning, weaving, and especially in carding. Microscopically, asbestos fibre consists of two different elements. The bulk of the fibre is translucent and glistening, with here and there black opaque angular particles. These particles are the iron-containing portions and the cause of dust and danger. The iron content in the finished article (as ferrous oxide) is 0·1 per cent, in the crude raw material 2·81 per cent, and in the dust from the carding room 18·4 per cent.

The cases of Cooke and McDonald, and two of Simson's cases, were complicated with tuberculosis. Sufficient cases have not yet been reported to base an opinion upon the liability to secondary infection by tuberculosis, but in the United States from one source[4] there were 13 deaths in seven years, 3 of which were from tuberculosis, and in 1910 Collis[5] found 5 deaths from phthisis in five years amongst a staff of less than forty workers in an asbestos factory.

In the histology of these cases (*Plates XXXVIII, XXXIX*) the striking feature, apart from the fibrosis and the changes due to tuberculosis, is the presence of curious golden-yellow segmented structures with rounded or club-shaped ends embedded in the fibrous tissue, together with very minute doubly refractile particles which are presumably silica. Some of the yellow structures are free, but many phagocytosed by the large mononuclear cells in the alveoli. They do not stain with aniline dyes, but with dilute hydrochloric acid and potassium ferrocyanide give a well-marked Prussian blue reaction. It is concluded that the structures contain a large proportion of iron. Simson obtained similar bodies from the lungs of a guinea-pig exposed to asbestos dust experimentally. McDonald advances the hypothesis that these bodies are portions of asbestos fibres in the process of alteration and absorption by hydrolysis, either by direct chemical action or by enzymes. Their characteristic appearance should be an important diagnostic point in the recognition of the lung of an asbestos worker.

Sir Thomas Oliver[6] gives a short account of the clinical aspects of asbestosis. The clinical picture differs slightly from that of ordinary tuberculosis, in so far as there is a pronounced deadening of the skin varying from mild bronzing to slight blueness, a degree of shortness of breath in excess of the physical signs, a greater amount of general disability, little expectoration, and comparative absence of night sweats. It resembles silicosis in the marked shortness of breath on slight exertion, deficient respiratory capacity, physical debility, and, in cases not too advanced, absence of tubercle bacilli in the sputum. He remarks that in a British factory the dustiest process is 'hand-beating' of the finished mattresses used for covering and protecting the internal machinery of automobiles. This work should only be undertaken in a room separated from the main parts of the factory, with open windows at one end and strong down-draughts at the other, but even with this precaution masks should be worn.

REFERENCES.—[1]*Brit. Med. Jour.* 1924, ii, 147, and 1927, ii, 1024; [2]*Ibid.* 1927, ii, 1025; [3]*Ibid.* 1928, i, 885; [4]Hoffmann, *Bull. U.S. Bureau Labor Statistics*, 1918, June; [5]*Annual Report Chief Inspector Factories*, 1910: [6]*Brit. Med. Jour.* 1927, ii, 1026.

PULMONARY COLLAPSE, POST-OPERATIVE. (*See* LUNG, POST-OPERATIVE MASSIVE COLLAPSE OF.)

PULMONARY EMBOLISM. (*See* LUNG, EMBOLISM OF.)

PULMONARY FIBROSIS.

W. H. Wynn, M.D., F.R.C.P.

The frequent occurrence of fibrosis of the lung as a sequel to an acute infection, especially bronchopneumonia, is now well recognized. W. H. Wynn[1] considers that cases have been more frequent since the great influenza epidemic of 1918, and that they now form the largest group of 'chronic lungs'. Cases fall naturally into two groups: (1) those arising in childhood, and (2) those arising in adult life. The former group has been long recognized. They begin usually

PLATE XXXVIII

PULMONARY ASBESTOSIS

(SIMSON)

Fig. A.—Alveolus showing several large multinucleated giant cells containing golden-yellow bodies. (× 850.)

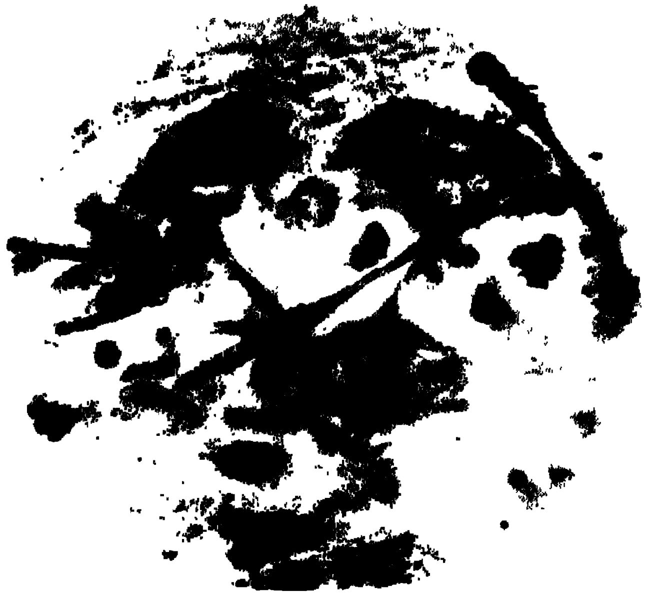


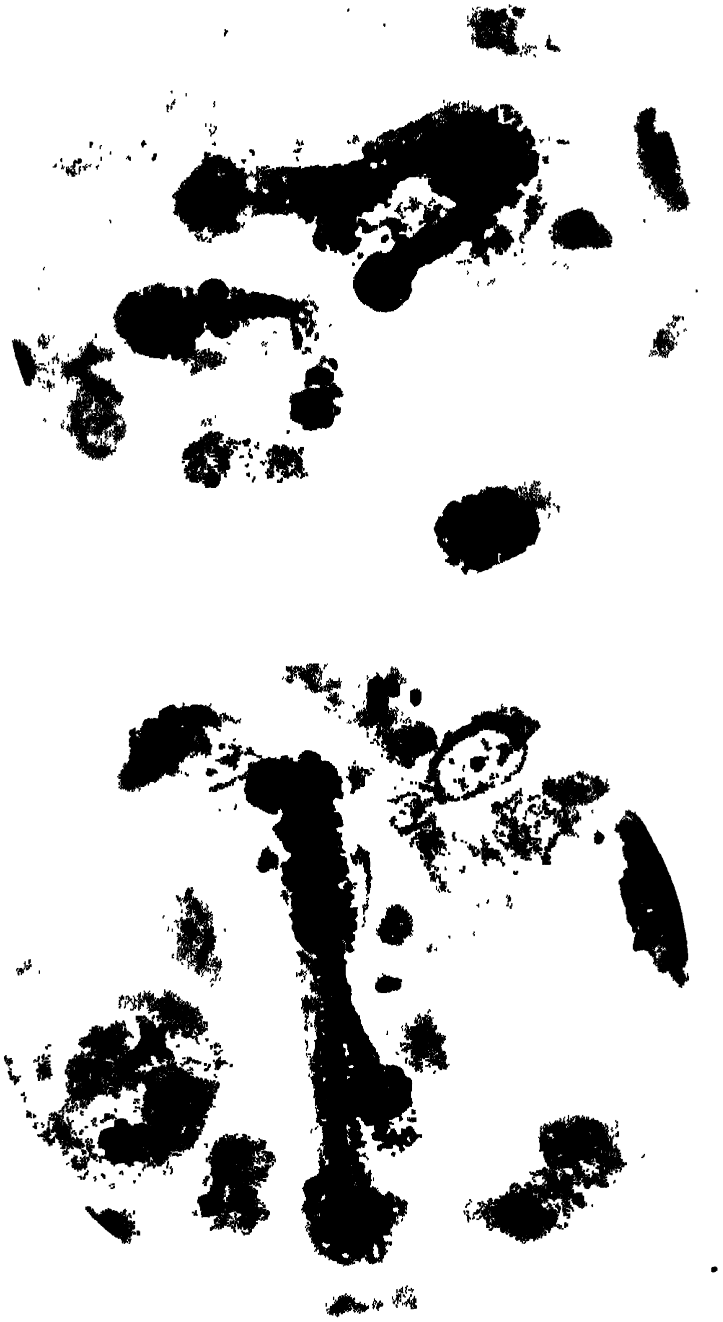
Fig. B.—This lung showed acute pneumonic consolidation; golden-yellow bodies in phagocytic cells and lying free in an alveolus. (× 850.)

Plates XXXVIII and XXXIX by kind permission of the 'British Medical Journal'

PLATE XXXIX

PULMONARY ASBESTOSIS—*continued*

(COOKE AND McDONALD)



Figs. C, D.—Curious bodies showing discoid arrangement and globular ends. (× 1000.)

within the first six years of life, and follow an attack of bronchopneumonia, either simple or associated with whooping-cough or measles, or they may follow repeated attacks of bronchitis. A typical case is that of a child of 8 or 9 who is brought with the complaint that he has had a cough since bronchopneumonia at the age of 4. The cough tends to occur in paroxysms, and is worst on waking, or it may be brought on by excitement, talking, or slight exertion. It is worse in the winter, but may persist through the summer. Sputum is scanty and viscid and may occasionally contain blood. There is diminished expansion and flattening of the lower part of the chest on one side with some alteration of resonance. Numerous râles are heard over the affected area, and perhaps a few at the base of the opposite lung. Tonsils and adenoids are usually present, or may have been removed. The general health is less impaired than might be expected; but there are occasional exacerbations with a rise of temperature and an increase in symptoms and signs. A diagnosis of bronchopneumonia may be made, but the condition is one of increased catarrh in a fibrosed lung. Slight cases may become stationary or even lose their signs and the children grow up well and able to live normal lives, but often signs persist, the disease progresses, and bronchiectasis develops.

Wynn describes a similar condition in adults, which he regards as most often due to an influenzal infection and terms 'chronic influenzal fibrosis'. In three years he collected 100 adults in all of whom signs of fibrosis were associated with influenza bacilli in the sputum. In all cases the bacilli were grown from the sputum, and in the majority were found in cultures from the nasopharynx. The growth was abundant but never pure, streptococci and *Micrococcus catarrhalis* being the most common associates. In the 100 cases 53 were males and 47 females; 69 cases were between the ages of 30 and 55. These ages corresponded with the fact that influenza in epidemic form was particularly a disease of early adult life, and that we are now seeing the scars left by the epidemic of 1918 and subsequent years. The important point in the history of these cases was that, with few exceptions, patients could definitely trace back their trouble to some acute respiratory infection, and in 80 per cent this occurred in adult life; 25 gave a definite history of influenzal bronchopneumonia, 17 of severe epidemic influenza, and 21 severe colds with bronchitis, probably influenzal in nature. In only 4 was there an insidious onset and no definite time could be stated when the cough began. On examination, all the cases showed signs of fibrosis of the lungs, varying from slight signs at one or both bases to a widespread bronchiolectasis or a massive fibrosis. The cases were roughly classified into five groups: (1) *Chronic bronchiolectasis.* The physical signs are very characteristic: abundant medium-sized moist râles heard over the whole or greater part of both lungs of a patient who, whilst distinctly unwell, is yet able to walk about. (2) *Localized bronchitis.* A slighter form of the first variety. Over some area of the lung, more often a lower lobe, râles are constantly heard. X-ray examination shows increased lung striæ spreading from the root to the damaged area. The condition is one of fibrosis with some dilatation of the smaller tubes, forming a chronic focus of infection which in acute exacerbations spreads to the rest of the lungs. (3) These cases in addition may have *asthma.* In 7 of the cases asthma was the first complaint, and in 8 others it became a prominent symptom. (4) *Massive fibrosis* is a less usual condition. (5) *Bronchiectasis* of the classical type is not often seen.

Fibrosis in children is most common in the lower lobes, but in adults it has not the same predilection for the bases. In 63 cases the changes were limited to the lower lobes, in 24 the upper lobes were affected, and in 13 both upper and lower. In 20 the right lung only was affected, and in 10 the left lung only;

in the remainder both lungs were affected to a varying extent. All the patients complained of fatigue and general weariness. They were often regarded as neurasthenic; fits of depression were not infrequent. Nearly all showed the effort syndrome. Weight was not much affected, and in a few cases there was obesity. Thyroid disturbances were common. Associated infection of the nose and throat was almost invariable. An appreciable hæmoptysis occurred in 7, and in 3 was at times alarming in amount. The most important error in diagnosis is to mistake these cases for tuberculosis. Many patients in sanatoria have chronic influenzal fibrosis.

The change in the lung is a peribronchial fibrosis. In influenza the bronchioles are specially attacked, the alveoli being secondarily affected. The bronchioles become blocked with secretion and desquamated cells, the mucous membrane is destroyed, and the bronchiolar wall infiltrated with inflammatory exudate and cells. This inflammatory tissue organizes and leads to fibrosis. Dilatation of the bronchioles may occur during the acute stage, or more gradually from the traction of the new-formed fibrous tissue. If the changes are slight and the infection becomes extinct the process may stop, but in the cases described the infection persisted and the condition was a progressive one. Fibrous tissue once formed cannot be removed, and the lung is permanently damaged.

Treatment is limited to attempts to improve the general health and to control the infection. The nose and throat require efficient treatment to prevent foci of infection there from reinfecting the lungs. Removal to a more equable sunny **Climate** will increase the patients' comfort and prolong their lives. **Autogenous Vaccines** are of great value in controlling the exacerbations, lessening cough and sputum, and improving the general health. The initial dose must be small, not exceeding one million, and the doses must be gradually increased, avoiding reactions. Treatment should be continued for several months. In spite of treatment the infection persists in many cases and the patients are 'carriers'. More care should be taken in every case of bronchopneumonia to make sure that the condition has entirely cleared up before the patient passes from our observation, and as much anxiety should be shown about the lung after acute diseases as about the heart in acute rheumatism.

C. de W. Kitcat and T. H. Sellors[2] re-examined 53 cases in children under 15, five years after their last attendance at hospital. They found 17 per cent fit and without signs or symptoms, 30 per cent fit but with physical signs, 43 per cent were not fit and had signs of permanent injury, and in 10 per cent bronchiectasis had supervened. Those with persistent fibrosis thus formed the largest group, and the majority of these were confined to bed or house at frequent intervals during the winter months. The primary causes in these cases were: measles alone 26·5 per cent, whooping-cough alone 15 per cent, measles with whooping-cough 30 per cent, 'pneumonia' 26·5 per cent, scarlet fever 2 per cent. An accurate history of bronchopneumonia following measles or whooping-cough could not be definitely established, but was suggested in the majority. The 'pneumonia' was probably an exacerbation in a fibrosed lung and not a true pneumonia. In the treatment of incomplete resolution attempts must be made to reventilate the sclerosed areas by breathing exercises. Where bronchiolar dilatation has occurred, natural or artificial methods of reducing the size of the thoracic cavity should be considered. If the child is young enough the chest wall will probably retract sufficiently to compensate; but when the thorax is too rigid, more radical measures, such as artificial pneumothorax, phrenicotomy, or more extensive surgical measures may be indicated.

REFERENCES.—[1]*Lancet*, 1927, ii, 964: [2]*Brit. Med. Jour.* 1928, i, 1018.

PULMONARY RHEUMATISM. (*See* LUNG, RHEUMATIC.)

PULMONARY SYPHILIS. (*See* LUNG, SYPHILIS OF.)

PULMONARY TUBERCULOSIS. (*See* TUBERCULOSIS, PULMONARY.)

PURPURA AND HÆMORRHAGIC BLOOD DISEASES. *Ivor J. Davies, M.D.*

H. L. Tidy,[1] under the title of the *hæmorrhagic diathesis*, includes all varieties of primary purpura. Secondary symptomatic purpura is only referred to incidentally. Hæmophilia is not included. The primary purpuras are (*a*) hæmorrhagic purpura, (*b*) anaphylactoid purpura. Henoch's and Schönlein's purpura are included in the second group. Tidy's conclusions are as follows: (1) Increased permeability or defect of the capillary endothelium is the essential cause of the hæmorrhages in the hæmorrhagic diathesis. (2) Alterations in the number of platelets are secondary to the capillary hæmorrhages. (3) The hæmorrhagic purpuras form a single group, and are only separated from urticarial (anaphylactoid) purpura and urticaria by the degree of the capillary defect. (4) Splenectomy should have a permanent beneficial effect, though protection from capillary hæmorrhages may not be complete.

R. V. Christie[2] has studied *blood coagulation* in hæmorrhagic diseases and submits the following conclusions: (1) By taking the coagulation time of successive drops of blood from a single stab wound, he gets not only the coagulation time of the blood, but also an index of the tissue reaction and platelet reaction, and thus a true index of the hæmorrhagic tendency. (2) In hæmophilia he gets a characteristic curve, indicating a deficiency in the coagulative elements of the blood, and also a deficiency of the platelet reaction. (3) In severe purpura and jaundice he gets a characteristic curve, indicating a deficiency of the platelet reaction. (4) Three cases are described where, although there was a definite hæmorrhagic history, the coagulation time was normal. The coagulation curve in these cases is definitely pathological.

R. V. Christie, H. W. Davies, and C. P. Stewart[2] record their observations on *hæmic functions in hæmophilia*. The following summary and conclusions are drawn from their paper: (1) From a study of the effects of lysis and switching on the coagulation of normal blood they have advanced, tentatively, the suggestion that thromboplastic substance does not exist as such in unshed blood. (2) From an extension of this study to hæmophilic blood and to hæmophilic plasma containing platelets they have reached the conclusion that in part the coagulative defect in hæmophilic bloods consists in a slow liberation of prothrombin from the platelets. (3) In hæmophilic blood the serum calcium, the plasma non-protein nitrogen, total nitrogen and chlorides, and the blood cholesterol and inorganic phosphorus are present in normal amounts. (4) In hæmophilia there is a further coagulative defect, namely, the slow conversion of prothrombin into thrombin. The thrombin, when formed, is normal in amount. (5) Study of the acid-base balance in hæmophilia showed that the pH of the arterial blood, calculated from the Henderson-Hasselbalch equation, is within normal limits. The CO_2 dissociation curves of all cases showed, at the physiological range, an undue flattening as compared with curves of the blood of Haldane and other normal individuals (determined by similar methods). It was shown that the normal chlorine interchange between corpuscles and plasma with varying CO_2 pressures occurred only to a very slight extent and with extreme variations of pressure. (6) It is suggested that the slow liberation of prothrombin and the deficient chlorine interchange may be due to a common cause.

R. V. Christie and Professor Gulland[2] describe the *treatment of hæmophilia*. With the exception of Pickering and Gladstone, who ascribe the cause of hæmophilia to an excess of protective colloid in the prothrombin-fibrinogen complex, all modern investigators agree that the deficiency lies in the circulating prothrombin whether it be quantitative or qualitative. The latter (a qualitative deficiency) is the view now held by most authorities, a slow availability of prothrombin being the more or less accepted theory of the cause of hæmophilia.

The following are the conclusions of their study: (1) The only means by which the coagulability of hæmophilic blood can be increased to any appreciable extent, and the symptoms definitely controlled, is by blood transfusion, whether it be whole blood, citrated blood, or defibrinated blood. Of these they believe the citration method to be the best. (2) This improvement lasts from five to seven days; it is the degree and not the duration of improvement which depends on the amount of blood given. They found no negative phase as was suggested by Addis. (3) A slight but transient improvement was obtained after intravenous injection of fresh human sera. Subsequent injections produced no cumulative action. (4) Hæmostatic serum, sheep-serum (not fresh), horse-serum (not fresh), 'Fibrinogen-Merrell', peptone, calcium, thymus extract, and protein shock have been tried with negative results. (5) Intravenous sodium citrate has been given an extensive trial, and appears to be of some slight therapeutic value. (6) Locally, they have found the most effective coagulant to be **Fresh Human Blood** soaked in cotton-wool and applied after removal of all useless clots. (7) Anti-platelet serum, intravenous calcium chloride, and thymus nucleic acid are suggested as being worthy of a trial in the treatment of hæmophilia.

G. R. Minot[3] observed five cases of a *chronic familial hæmorrhagic condition* characterized by a prolonged bleeding time and by the absence of a decrease of blood-platelets and a delayed coagulation time of the blood. Multiple ecchymoses and recurrent epistaxis are characteristic symptoms. Pathological blood loss and abnormal bleeding time may be present at one time and not at another, but their occurrence is not necessarily synchronous. This hæmorrhagic condition appears in infancy and may extend into adult life, but then its severity tends to decrease and the condition may disappear as the patient grows older. The etiology of this type of hæmorrhagic diathesis is obscure. Unlike hæmophilia, it may occur in father and son, and it is not associated with prolongation of the coagulation time of the blood. In contrast to thrombopenic purpura (purpura hæmorrhagica), the blood-platelets are not decreased and the clot retracts normally.

J. S. Sweeney[4] reports a case of *chronic aplastic anæmia* with a symptomatic hæmorrhagic purpura, probably due to benzine poisoning, in which the endothelial cells or the capillary system and the blood-forming cells of the bone-marrow bore the brunt of the chemical intoxication.

H. Z. Giffin[5] reports a group of cases of *severe hæmorrhagic disease* presenting unusual features which he has observed at the Mayo Clinic. Cases of splenomegaly in which mild types of purpura occur are not uncommon, but in the two cases reported the features of splenic anæmia are associated with a more severe type of purpura which shows the coagulation features of hæmorrhagic purpura. It would naturally be inferred that the purpura, even in this type, is of a secondary nature. It might also be inferred that some specific influence of the spleen itself, probably related to destruction of platelets, leads to varying degrees of purpura; and, moreover, that hæmorrhagic purpura may be only a more severe manifestation of certain types of mild purpura, even though the cases of mild purpura do not show all of the characteristic features of hæmorrhagic purpura on examination of the blood. An instance in which severe hæmorrhagic disease occurred in the women of four generations, without the characteristics either of hæmophilia or of hæmorrhagic purpura, suggests that the bleeding may be due to some deficiency of the blood that has not yet been identified. An instance of severe hæmorrhagic disease with all the features of hæmorrhagic purpura except thrombocytopenia also suggests the possible presence of some unknown factor of coagulation which renders diagnosis at present impossible. A case of severe hæmorrhagic disease with extremely high viscosity of the blood, due to an enormous increase in the serum globulin and other changes of uncertain significance, emphasizes the lack of knowledge concerning the proteins of the blood and presents a clinical syndrome which, so far as Giffin knows, has not been recorded.

In a preliminary communication, J. W. Sooy and T. S. Moise[6] reported a new and more rational method of treatment of *idiopathic purpura hæmorrhagica* (essential thrombocytopenia). The rationale of their measure was based on the knowledge that increments in platelets were observed in rats exposed to mercury quartz lamp irradiations and to sunlight. E. Tolstoi[7] has treated three cases of the affection by the mercury vapour lamp. The cases were of the chronic variety. In none of the cases had he noted an improvement, and while he did not wish to generalize regarding this method of treatment, it can be emphatically stated that, in his hands at least, the method failed to produce the results claimed for it.

REFERENCES. [1]*Brit. Med. Jour.* 1928, i, 583; [2]*Quart. Jour. Med.* 1927, July, 471 510; [3]*Amer. Jour. Med. Sci.* 1928, March, 301; [4]*Ibid.* 317; [5]*Ibid.* Jan., 44; [6]*Jour. Amer. Med. Assoc.* 1926, July, 94; [7]*Ibid.* 1927, July, 370.

PYLORUS, CONGENITAL HYPERTROPHIC STENOSIS OF.

John Fraser, Ch.M., F.R.C.S.Ed.

Seymour Barling[1] contributes a paper on this subject. Twenty cases, all submitted to operation, were reviewed, and while the mortality in hospital cases reached 48 per cent, there was not a single death in the private series. This remarkable fact has been noted by others, especially by the late John Thomson. Barling believes that early diagnosis is a vital factor in the prognosis of the case, and brings out the fact in the following way: among private patients the average time during which symptoms existed before operation was thirteen days; observing hospital cases from a similar standpoint, he found that in those cases which recovered the pre-operative symptomatic period was eighteen days, while in those cases which succumbed it averaged twenty-five days.

Barling is an advocate of the surgical treatment of the disease. He recognizes that a certain proportion of cases may improve or even recover under a careful medical régime, but, as he points out, no one can foretell the individual case which will so benefit. It may be that after weeks of experiment the failure of medical means becomes apparent and operation is employed, but upon a patient devitalized by the delay. The diagnosis is made on the clinical findings. X-ray examination used to be employed as a method of investigation, but this has been abandoned as an unnecessary strain upon the child.

Before the operation is carried out the child remains under observation in hospital for some days; during this time there is daily lavage of the stomach and bowel. Immediately before operation a subcutaneous saline is administered. A gas-oxygen anæsthesia is employed (in certain cases a trace of ether becomes necessary), and the operation is performed by the Rammstedt method. The post-operative period is a great anxiety to the surgeon, and the most careful attention to diet is required over a period of time which bears direct relationship to the length of time symptoms have existed before operation. It means, in fact, that the dilated stomach affected by chronic gastritis, and the atrophic intestine, are ill adapted to resume their proper functions, and must therefore be carefully nursed to full health. For this purpose breast-milk is undoubtedly the best if it is available; in unresponsive cases lactic acid milk is often beneficial.

Camillo Foramitti[2] is in favour of delaying operative measures until all dietetic and antispasmodic treatment has failed. Where surgical methods are demanded he favours the operation which Nichol described in 1900—the opening of the stomach by a small incision in the anterior wall, the passing of the curved clamp through the pylorus, and the stretching of the pyloric obstructing tissue by gradually opening the clamp. It is claimed that by this method the pylorus is dilated but not injured. The paper reports the record of thirteen cases with two deaths - one from enteritis and pneumonia sixteen days after operation, and one from a post-anæsthetic pneumonia in a very feeble child.

A further point not commonly alluded to is the distinction between two types of congenital pyloric obstruction the swollen, pale, cartilaginous-like change in which there is distinct evidence of hypertrophy of muscle fibres, and the smaller but firmer and more fibrous type in which there is an overgrowth of connective tissue. It is suggested that the second is a change consequential on the first, and that it is a lesion unlikely to be benefited by anything but surgical interference.

Professor M. Kirschner,[3] of Tübingen, is strongly in favour of the operative procedure. He records a series of fifteen cases, and, while these have been completed without a single death, the total is scarcely large enough to permit the assumption that the last word on this subject has been said. This subject formed the basis of an exhaustive discussion at the Conference on Children's Diseases held at Düsseldorf in 1926. The opposing aspects of the problem were then presented in the fullest detail, and striking divergence of opinion was expressed. On behalf of the purely conservative treatment, the Children's Clinic in Jena claimed the remarkably low mortality of 1·9 per cent; the best operative mortality was reported by Strauss (2·7 per cent), while the average operative death-rate was 12 per cent. Kirschner criticizes the accuracy of these various figures, and casts doubt upon the reliability of the results claimed for the purely conservative treatment. He does not deny the value of medical treatment. It is his contention that in every case conservatism should be given a fair trial, but as soon as it becomes evident that this alone is proving unsuccessful, operation should be carried out. He practises the Weber-Rammstedt technique, and a light chloroform anæsthesia is employed; any type of rectal anæsthesia is condemned because of the risk of intestinal paralysis. A mid-line supra-umbilical incision is favoured, and the pylorus, held between the finger and thumb of the left hand, is divided longitudinally through an avascular area and with a sharp scalpel. The division is carried out from stomach to duodenum, and it must be complete, for any undivided constricting fibres are liable to result in further vomiting—a complication which may easily prove fatal in a debilitated infant. To facilitate the complete division of the fibres Kirschner recommends that the operator should wear magnifying spectacles, particularly if he be in any way short-sighted.

Dr. Bruno Hundsdorfer[4] is Professor Kirschner's first assistant, and he contributes an article which affords further details of Kirschner's cases and methods. He considers Finkelstein's recommendation to persevere with conservatism for fourteen days unduly long, and recommends the obviously wise course of avoiding any dogmatic limit and of recognizing the demand for operation when the condition does not quickly yield to medical measures.

Some consideration is given to a form of treatment which has scarcely been employed in this country—the dilatation of the pylorus by the passage

PLATE XL

THUMB-SIGN IN PYRAMIDAL DISEASE

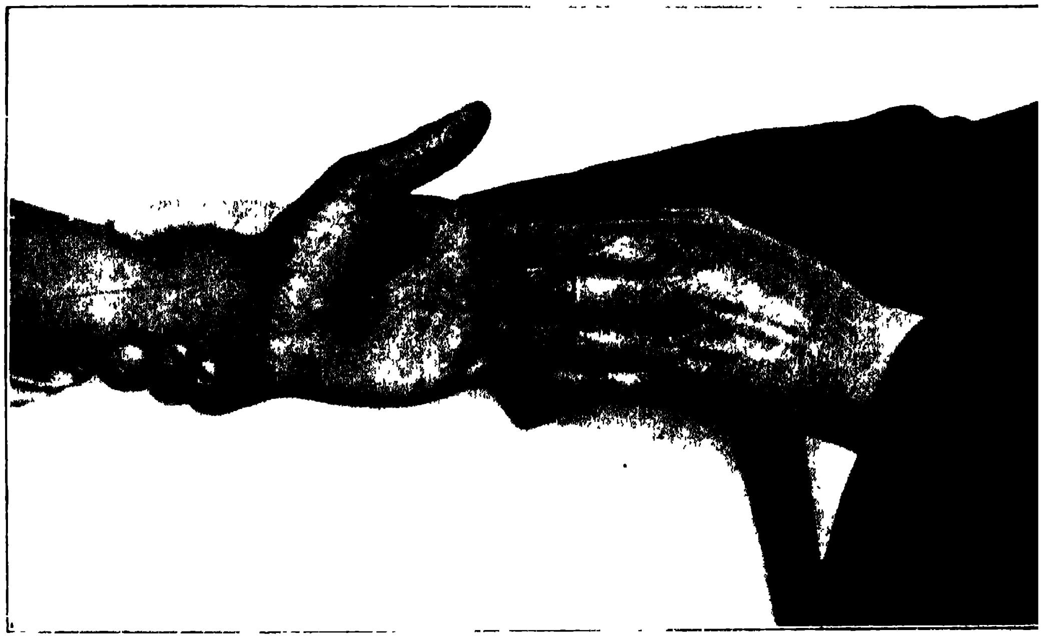


Fig. A.—Normal side.

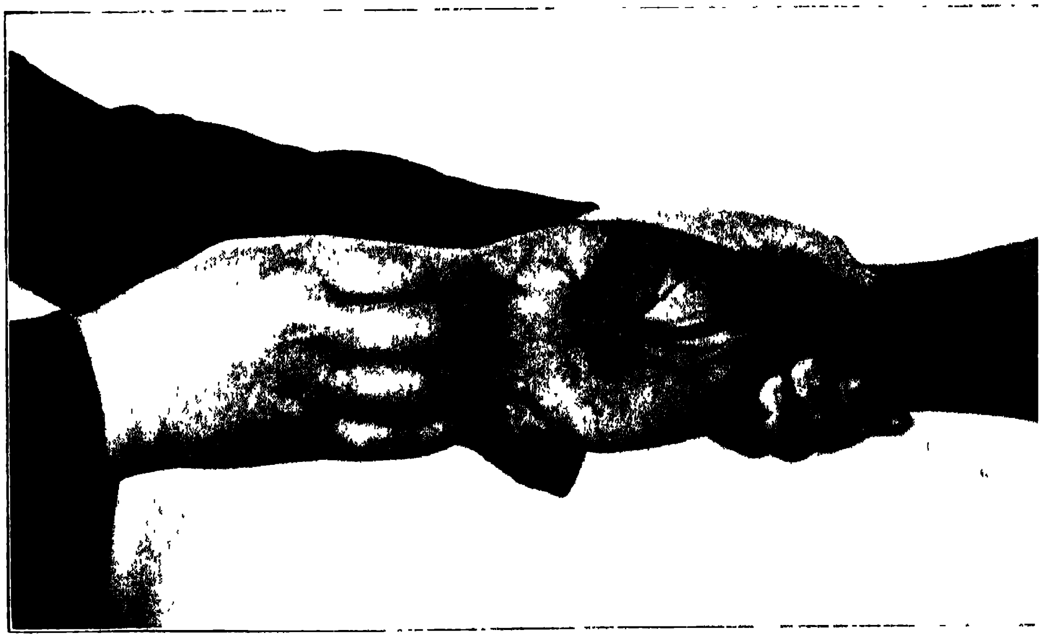


Fig. B.—Diseased side (slight pyramidal lesion).

Plates XL XLII by kind permission of the 'Deutsche Zeitschrift für Nervenheilkunde'

PLATE XLI

THUMB-SIGN IN PYRAMIDAL DISEASE *continued*

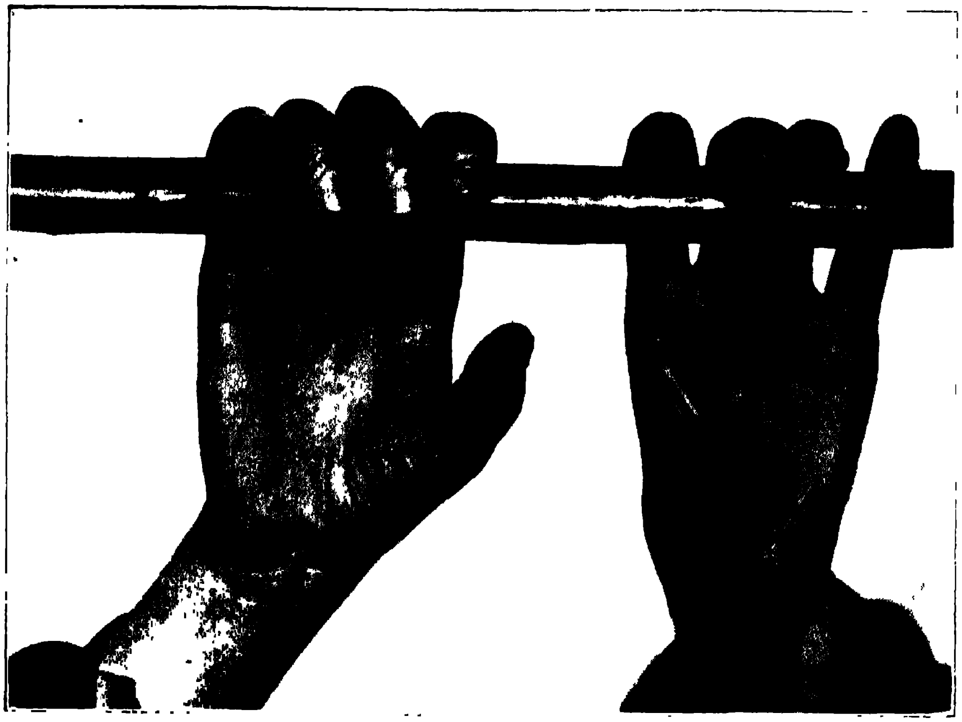


Fig. C. Patient with right-sided hemiplegia hooking both hands over a stick

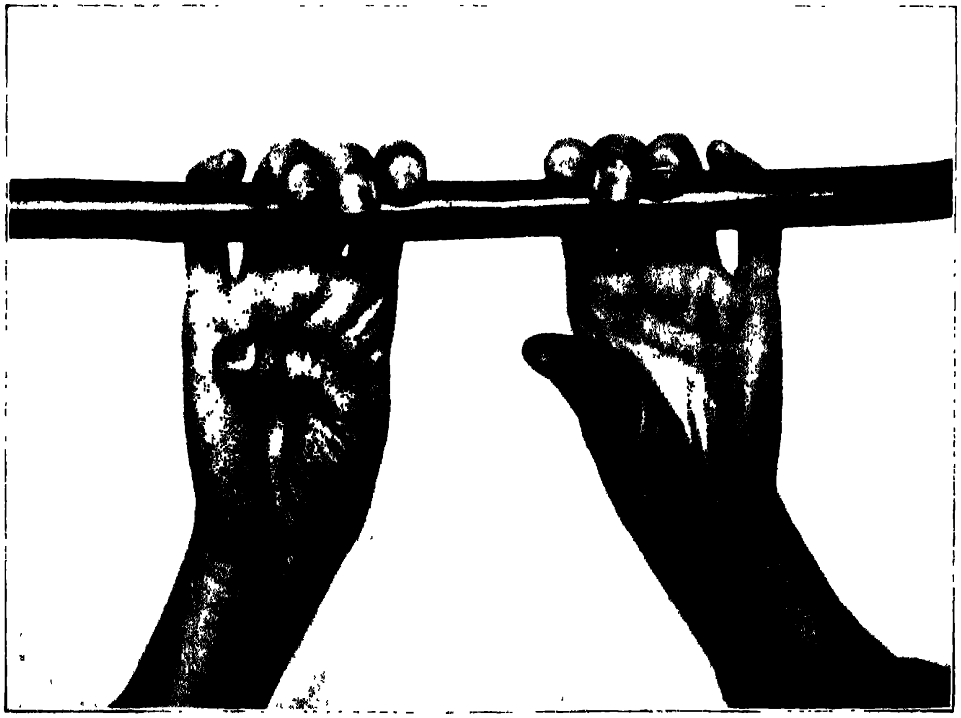


Fig. D.—Patient pulling hard with both hands against a stick. Note the involuntary associated movement of the right thumb.

PLATE XLII

THUMB-SIGN IN PYRAMIDAL DISEASE *continued*

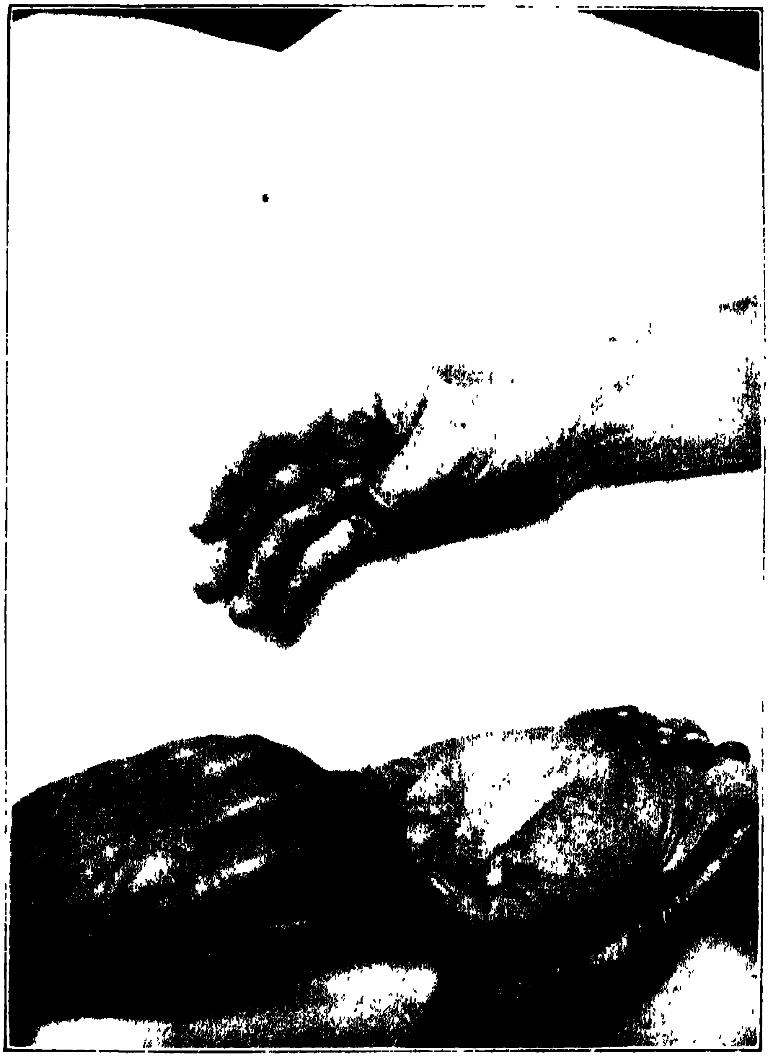


Fig. L.—Contralateral associated movement of right thumb in a case of right hemiplegia during forcible flexion movement of the healthy left thumb.

of the duodenal sound. The method is wholeheartedly condemned as full of risk, and yet not sufficiently beneficial to justify the acceptance of these risks.

One of the most striking arguments in deciding the question of operation arises in connection with post-operative radiological observations. Heile was the first to point out that the emptying power of the stomach suffers in proportion to the length of time that the pyloric obstruction is permitted to continue. He showed that in all cases which were operated on within two weeks from the onset of symptoms no residue was found in the stomach on later examination, while those in which the operation had been delayed beyond that period invariably showed retention and hyperacidity of contents.

Under the heading of diagnosis the assistance given by the barium-meal X-ray investigation is discussed, and the conclusion is arrived at that it is a valuable and reliable means of deciding, not only the nature of the pyloric obstruction, but also its degree.

References. [1]*Lancet*, 1927, ii, 492; [2]*Wien. klin. Woch.* 1927, Nov. 3, 1380; [3]*Zentralb. f. Chir.* 1927, Dec. 10, 3146; [4]*Munch. med. Woch.* 1927, Oct. 7, 1697

PYORRHŒA ALVEOLARIS. (*See* Dental Sepsis.)

PYRAMIDAL DISEASE, THUMB-SIGN IN.

Sir James Purves-Stewart, K.C.M.G., C.B., F.R.C.P.

Attention has recently been called by R. Wartenberg[1] to a useful sign of organic pyramidal disease affecting the upper limb, consisting in a characteristic involuntary associated movement of the thumb, elicited as follows: The patient, with his eyes turned away, or, better, shut, lays his supinated forearm in the physician's left hand, which grasps and fixes it firmly from below. The patient is now told to bend with all his force the terminal and middle phalanges of the fingers from index to little finger. This movement is resisted by the observer, who hooks his own fingers into those of the patient. When the patient forcibly flexes his fingers in this fashion, at the climax of the effort the thumb becomes strongly flexed, adducted, and opposed (*Plate XL, B*), thereby assuming a posture which is familiar in old cases of hemiplegic contracture. This position, by the way, is normal in infants during the first three weeks after birth.

In a normal adult hand the thumb either remains extended (*Plate XL, A*) or shows an involuntary flexion of its terminal and even also of its proximal phalanx, but does not exhibit the characteristic adduction or opposition movement. The difference between the healthy and the hemiplegic limb can also be demonstrated by pulling with both hands against a stick (*Plate XLI*), when the movements of the two thumbs can be compared.

This phenomenon is elicited in slight as well as severe cases of pyramidal lesion and may constitute the only residual physical sign in a slight case. The test cannot be employed in cases of contracture or of complete paralysis, nor in conditions of unconsciousness, since voluntary co-operation by the patient is essential.

It is interesting to note that a similar associated movement may sometimes be elicited in the paralysed hand when the healthy contralateral hand makes powerful flexion movements of the fingers. Thus *Plate XLII* is from a patient with right-sided hemiplegia who is trying to flex the left or healthy hand against resistance. We observe that meanwhile the thumb of the right hand, i.e., on the hemiplegic side, makes a strong associated movement of flexion and opposition, whilst the sound thumb makes only a slight flexion movement.

Reference.—[1]*Deut. Zeits f. Nervenh.* 1928, cii, 81.

RADIOLOGY. (*See also* X-RAY DIAGNOSIS.) *C. Thurstan Holland, F.R.C.S.*

The Second International Congress of Radiology was held in Stockholm at the end of July, 1928, under the presidency of Professor Gösta Forssell, the first having been held in London three years ago, whilst the next is to be held in Paris in 1931 with Dr. Béclère as president. This Stockholm Congress was even more successful than the one in London. Nearly 1000 registered as members as against about 700, and thirty-nine nationalities were represented. If anything was required to show the vast importance of radiography in medicine and surgery, it would be found in these Congresses. It is only thirty-three years since the discovery of X rays, and in this short space of time, starting as a toy of the medical profession, the position of radiology now is of such importance that it is difficult to visualize medical work, either in hospital or in private, in the pre-X-ray days. The Crown Prince of Sweden opened the Congress with a speech delivered in English, in the large Concert Hall, which was filled to overflowing by some 2500 people. The same day there was a reception at the Palace. The city of Stockholm gave a banquet to 750 guests, followed by a ball in the Grand Hall to which 2000 were invited. The Congress itself used for its meetings the Houses of Parliament, lent for the occasion. Some 300 papers were read in all languages and on every variety of subject, diagnostic and therapeutic, in which either X rays or radium are used. Perhaps one of the most striking demonstrations was that given by the President, when over a hundred cases which had undergone radiation treatment passed in review before a large audience. In this demonstration lantern slides showed the condition before treatment, and detailed the particulars of each case including the exact treatment, whilst the patient in person showed the result. Short abstracts of all the papers read have been published in book form by the Congress, and two additional volumes of *Acta Radiologica* for 1928 contain the invited papers, and the papers on instruction and training in medical radiology.

Pitfalls in Radiology.—At the Cardiff meeting of the British Medical Association H. J. Paterson[1] read a paper on this subject. It was followed by a discussion. A paper with the same title by A. E. Barclay,[2] also followed by a discussion, is very much on the same lines. Radiologists and practitioners will find much that is of interest in the perusal of these communications, and will be amused by many of the mistakes in diagnosis related by various speakers.

[In criticizing the two papers, we suggest that, whilst Barclay takes the subject from the proper standpoint, on the other hand Paterson's attack on radiography is unfair and illogical. Why should X rays and radiologists be expected to be infallible? A complete answer to the style of criticism adopted by Paterson is: Take any single method of diagnosis, clinical, pathological, radiological, or otherwise; which, standing alone, will make the fewest mistakes? Radiological diagnosis for certainty and accuracy stands out pre-eminently, in fact it is in a class of its own. By X-ray examination certain facts are made out upon films or by screen examination. The interpretation of these facts is the work of the radiologist, and he should not commit himself to an interpretation without having all the cards in his hands; i.e., he must have a complete report on the case—not necessarily the opinions of the observers—from every other aspect. The value then of his report and opinion is in exact ratio to his skill and attainments as a radiologist. That he will make some errors in interpretation is of course obvious—no one is infallible. We do not consider that 'pitfall' is the correct word to apply to most of the recorded errors: 'mistake' would be better. In neither paper is the most important source of errors indicated. There is an enormous amount of utterly unreliable radiographic work being done all over the country, in private and in hospitals.

Films of the poorest quality, and diagnostically worthless, are accepted by physicians and surgeons often making their own X-ray interpretations—as reliable. A mistake naturally follows, and the X-ray is blamed. A further source of error is the so-called radiologist who, miserably equipped technically, and still worse professionally, poses as an expert; in many respects he is even more dangerous than the surgeon who interprets his own plates. A leading article[3] on this subject should be read.—C. T. H.]

New Apparatus.—In a review of portable X-ray apparatus E. J. H. Roth[4] describes the new apparatus designed by Messrs. Philips and known as the "Metalix Portable" set. This is a completely new departure in portable apparatus, is more or less fool-proof, and is so designed that it assures safety to both patient and operator. In addition, the chief point is that it is contained in only two cases, one of which weighs under thirty pounds and the other forty pounds, and so for the first time the use of the word 'portable' is justified. The writer has had the advantage of fully testing out the apparatus, and has found it satisfactory.

Radium and X-ray Dangers. At the Second International Congress of Radiography at Stockholm the question of protection for X-ray and radium workers and patients was discussed very fully. Two complete series of recommendations were put forward, and in the end it was decided that the "Proposals from the British X-ray and Radium Protection Committee", which were designed to unify protective measures and to improve the working conditions of X-ray and radium operators in all countries, should be officially approved of and adopted by the Congress. A rider was added that these recommendations were not necessarily final, and were open to amendment and revision at any future Congress if future experience made this desirable. The importance of international agreement on this subject is obvious.

An illuminating paper by A. E. Barclay and S. Cox[5] describes their attempt to measure the quantity of X rays used in diagnosis and to assess the danger to the radiologist. This is certainly a paper which should be carefully studied by every radiologist, as from beginning to end it is full of practical material of very great importance. After describing in minute detail the measurements on which they base their protective recommendations, the latter are fully stated with regard to (1) the taking of plates, and (2) the making of screen examinations. The authors express the opinion that there are not necessarily any risks attached to X-ray work provided the radiologist is suitably equipped, both as regards apparatus and accommodation. One worker, however, often entirely overlooked, who should have special treatment, is the dark-room assistant. The dark-room can never be really healthy, and most of them are inadequate in size and badly ventilated. A worker in such a room requires special hours and holidays. Generally speaking, the authors in their conclusions do not differ widely from the recommendation of the British Protection Committee, but suggest that some of these recommendations go beyond what is strictly necessary.

REFERENCES.—[1] *Brit. Med. Jour.* 1928, ii, 249 and 595; [2] *Proc. Roy. Soc. Med.* (Electrotherap. Sect.), 1928, March, 923; [3] *Brit. Med. Jour.* 1928, ii, 617; [4] *Ibid.* i, 247; [5] *Amer. Jour. Roentgenol.* 1928, i, 551.

RADIUM AND X-RAY THERAPY. (*See also* CANCER; ŒSOPHAGUS; PHARYNX, LARYNX, AND TONGUE, CARCINOMA OF; RECTUM; UTERUS; ETC.)

C. Thurstan Holland, F.R.C.S.

Radium.—There is no doubt now that for certain forms of malignant disease radium is not only as good as, but is even better than, surgery. The criterion of the final result of any treatment is of course the question of the cure of the disease, and in malignant disease the time perhaps to use the word 'cure' has hardly arrived; but in the article by Dr. Helen Chambers[1] on radium treatment of *cancer of the cervix* the claim is made that upon the evidence now available it has been conclusively proved that for the large majority of patients suffering from cancer of the cervix modern radium treatment can completely replace surgery and give equally good and longstanding results. The failure of radium, as indeed of operation, is due to the difficulty of dealing satisfactorily with the pelvic lymphatic glands; but it would appear that, as methods of radium application improve, this difficulty may be met. Whenever there is malignant disease the question of lymphatic gland infection has to be considered; surgery is a rough-and-ready, but very uncertain, method of dealing with this even when the glands are accessible, and radium can sometimes, at any rate, be applied even when glands are not accessible to surgery. A further important point is that there is no direct mortality from radium treatment, neither is there a long and unpleasant time of recovery from a severe operation. If after-results are even only just as good as surgery, then from the patient's point of view there is everything to be said in favour of radium. British gynæcologists have been slow to realize the value of radium treatment even now with the accumulated pressure of results and statistics from radium centres and radium workers in many countries, and yet Howard Kelly said many years ago nearly all that is said at the present time on the advantage of radium treatment over surgery in many uterine conditions. In those days he spoke as one in a wilderness; now it is recognized that he was a pioneer with vision.

The 1927 report of the Radium and X-ray Committee of the Medical Research Council,[2] which analyses the results obtained in various hospitals using radium, is full of statistics of results and of exact detail as regards methods. A further report (1928)[3] advances the matter still further. This report deals with *cancer of the breast, the cervix uteri, the mouth and adjoining regions, and the rectum and bladder*, and again further valuable statistics, dating now up to six years after treatment, are available. It is becoming obvious that the results of the improved technique of the past few years are very much better than those obtained by the earlier technique, and it is imperative that those undertaking to treat these cases with radium should have a full working knowledge of the latest methods of application. Attention is drawn to the importance of supplementing radium treatment with deep X-ray therapy. The statistics of the Institute of Radium of Paris show that better end-results can be obtained in many conditions when the local radium treatment is supplemented by X rays or externally applied gamma rays.

H. R. Spencer[4] writes a well-balanced paper on the subject, and considers radium of especial value in *cancer complicating pregnancy*. His opinion also that the treatment of cancer of the cervix should be eclectic, and that no one treatment is suitable for all cases, emphasizes a point too often forgotten.

Radio-immunization.—This very interesting and difficult problem is discussed by A. Rosselet[5] in a paper in which the opinions and experiments of many of the best known radiotherapeutists are quoted. It is well known that in the treatment of some tumours, whilst a first series of exposures definitely decreases the size, and a second series also, but to a lesser extent, a third series produces little or no response. That is, a condition of decreased radio-sensibility is brought about. The author proceeds to discuss the causes of this, and also its bearing, from the point of view of the different methods of applying radiation treatment. His final remark is that it must be concluded that repeated irradiation does not necessarily result in radio-immunity, and the methods by which one thinks one can avoid it form one of the most captivating chapters of general biology.

Effect of X Rays on the Blood.—W. V. Mayneford and A. Piney[6] publish an account of the experiments carried out on this subject and of the results obtained. This is a valuable contribution to our knowledge on the subject. Mayneford is responsible for the apparatus and methods of exposure adopted in order that dosage should be accurately measured : this is set out in full detail in the first part. Following this, a second part by Piney deals with the hæmatological observations. Charts, drawings, and microphotographs are used for illustrative purposes. Summarizing the results : A rabbit receiving a lethal dose immediately developed a lymphocytopenia, and this persisted until death, which occurred when the number of monocytes had been above that of the leucocytes for about fourteen days. Other experiments were conducted by irradiation in daily small doses, and in the same dose administered at one sitting, and comparison of the blood changes made. These are of interest, and have a distinct bearing on X-ray dosage : it would appear that there is clear evidence that the effects of divided doses are more intense and more prolonged than those of a single dose, and it is interesting that the former causes no alteration in the number of the monocytes.

Effect of X Rays on the Heart.—A. S. Warthin and E. A. Pohle[7] carried out a number of experiments on rats and rabbits by exposing the precordial region to X rays of short wave-length as used in deep therapy. The surface dose in each case was a human erythema dose, and the animals were killed at various intervals after the exposure. The authors report that no gross pathological changes were found in any of the hearts subsequently examined, but that in the hearts of one rabbit and two rats there appeared to be evidence of changes in the heart muscle which could be ascribed to the effect of X rays. [The results of these experiments are reassuring up to a point, but there are several of the older radiologists in this country who are uneasy as to the possible effects on the heart of repeated small exposures to X rays extending over a long period of time.—C. T. H.]

Good results are reported by F. C. Arrillaga[8] in the treatment of **Angina Pectoris** by deep X-ray therapy. Eight cases were selected for treatment, all of a severe type and which had failed to respond to the usual methods. The author describes the technique he adopted, radiation being applied from the front and back over an area corresponding to the heart and aorta. It is claimed that recurrent attacks of angina ceased, usually after the first series of irradiations.

Effect of X Rays on Gastric Secretion.—J. T. Case and W. N. Boldyreff[9] review the literature of this subject, and point out that the reported results have been very discordant. They discuss many possible causes for this disagreement, and describe experimental work they carried out with a view to discern the exact cause for the discordance in the existing reports and to offer further testimony upon which to base a practical conclusion. A fundamental conclusion arrived at was that high-voltage, deep X-ray treatment acts only upon the functional activity without destroying the vitality of the digestive glands, which are fairly radio-resistant ; that any result obtained in the treatment of a gastric or duodenal ulcer is likely to be merely of transient and not lasting value.

The Combined Action of Colloidal Lead and Radiation on Tumours.—J. C. Mottram[10] describes some experiments carried out on mouse tumours and the results obtained. In view of the facts that the inoculation of colloidal lead into the circulation gives rise to thrombosis of the blood-vessels of tumours, and that radiation interferes with the blood-supply apart from its direct destructive action on the tumour cells, the experiments were directed to see if, by combining these two measures, tumours could be made to disappear by such doses that the toxic effects of lead would be avoided, and also the destructive action of radiation on the normal tissues. The experiments are described, and the author concludes that there is evidence to show that the combined method of treatment appears to be a definite advantage, and supports the view that it should be given a trial in the case of patients suffering from cancer. He also considers that although the amount of lead deposited in any tumour is very small, nevertheless the characteristic secondary radiation from lead may have direct effect. [We have had an opportunity over a considerable period of time of observing many cases of cancer which have received injections of colloidal lead. The reaction to radiation treatment (X rays) which has occurred in these cases has given us a definite impression that the response to this combined treatment is better than that which results from treatment by either method alone.—C. T. H.]

The views of F. C. Wood (New York), as communicated to the Cancer Conference (London, 1928), following on experimental studies on lead therapy, differ in some respects from those of Mottram. He also expresses the opinion that the results obtained in certain subcutaneous tumours in human beings are better if the X-ray treatment is given first and the lead used three or four days *after* the radiation. [If this is the fact, then it would follow that the supposed effects of secondary radiations from lead previously injected are not of much, if any, importance.—C. T. H.] The author's final conclusions are of importance and interest. They are: (1) In using lead and X rays in combination, the maximum effect is produced on the Flexner-Jobling rat tumour by giving the X rays first, and following them with repeated doses of lead beginning from four to five days later. (2) The fact that lead is not an effective therapeutic agent in curing certain animal tumours does not prove that this metal will not cure human tumours; the final evaluation of this method must rest on clinical observations. (3) Animal experiments and clinical evidence both show that there is a distinct advantage in the use of X rays in combination with suitably spaced administration of lead.

Cancer of the Breast.—An interesting paper by H. Iselin[11] on the treatment of cancer of the breast after operation is worthy of consideration. This is a very careful survey of the author's own work, which has been considerably influenced by that of Sampson Handley. Accepting the permeation theory of spread by the lymph-channels, he has worked out his X-ray technique from this point of view, and this technique is explained in detail. He does not favour intensive treatment. It is to be noted, when the value of this prophylactic post-operative work comes to be estimated, that the author's work has been going on since 1906. Statistically the cases treated by irradiation show a much longer length of life than the controls which were not irradiated. Altogether this paper is one of much value. (*See also* BREAST, CANCER OF.)

Primary Carcinoma of the Lung.—R. Paterson[12] surveys the literature, and comes to the conclusion that there is no substantiated cure of a case of true carcinoma of the lung by irradiation. His experience is based on nineteen cases in which the diagnosis was reasonably substantiated, and he traced the history of these cases, all of whom died; seventeen had 'deep therapy', but the technique varied somewhat in different cases. This is the first time that the results obtained in a completed group of cases of this disease have been published. The author reports that length of life does not appear to be prolonged by X-ray treatment. On the other hand, the treatment is definitely indicated owing to the effect it has on symptoms; in many of his series there was marked immediate palliation, with easing of pain and reduction of cough.

The Suprarenal Gland.—A. U. Desjardins[13] surveys the position of X rays as regards this gland. He has collected the literature, and subjects it to destructive criticism in an able and fairly convincing paper. The literature approaches the gland from two points of view: (1) The result, beneficial or otherwise, in treatment of diseases affecting the gland; and (2) Experimental work to show that there is danger in irradiating the suprarenals in the human being. The author considers that most of the experimental work reported is of doubtful value, and gives his reasons for this opinion. He also argues that the supposed results—for example, that irradiating the gland will influence blood-pressure, or diminish the blood-sugar of diabetics—are not based upon reliable and solid ground. He finishes by saying that there is no evidence at all to suggest that the suprarenals are particularly sensitive to irradiation.

H. Frey[14] has carried out a large series of experiments on male guinea-pigs, killing them at varying periods of time from immediately after irradiation up to three months later in order to verify or otherwise the idea that the suprarenal bodies were hypersensitive to X rays, and that it was dangerous to expose this region. The details of these experiments and the histological findings are stated, and the author concludes that the statements in literature as to the direct damage caused by X rays and radium to suprarenals, and the great sensibility of these glands, are not according to fact; and, therefore, that all the warnings against therapeutic radiation of the kidney region on this account are out of place.

Irradiation of Brain Tumours.—H. K. Pancoast[15] during the past thirteen years has treated 136 cases of intracranial tumours, of which number 46 were pituitary growths and are not dealt with. The rest consisted of 42 cerebral and 48 cerebellar tumours, and these form the basis of the paper. The author discusses these cases, describes his technique, goes into the question of the indications for treatment, points out the dangers, and with regard to results, although not very optimistic, considers that in many instances surprisingly satisfactory temporary results have been obtained, and, in a few, more permanent ones.

P. Martin[16] reports three verified cases of *astrocytoma*, all of which were operated on, and all of which had post-operative X-ray treatment. The three cases are related in full, and the visual fields, microphotographs, and photographs illustrate the paper. There was no result, temporary or otherwise, from the radiation treatment.

A long and important paper on the roentgen therapy of *gliomas of the brain*, by P. Bailey, M. C. Sosman, and A. van Dessel,[17] the cases coming from the surgical clinic of Harvey Cushing, should be noted. Full technique and full notes are given of sixty-two cases. A full bibliography and notes of the discussion following the reading of the paper are added. Anyone contemplating the X-ray treatment of this condition will find most valuable information throughout this paper, both as to the indications and methods of treatment, and the results which may be expected. With all their experience the authors conclude that roentgen therapy will not cure any glioma, and they also point out the dangers and the bad results which may follow.

The Ovaries.—H. Martius[18] deprecates the prevailing belief that the action of X rays and radium on the ovaries is without risk to any future child. He considers that deep X-ray therapy as applied to the ovaries does prevent ripening of the follicles—a result which may be either temporary or permanent. If a pregnancy commences in the period between the administration of radiation and the onset of the resulting amenorrhœa, then undoubtedly the child is usually damaged. He is of the opinion that, if there is any possibility of a future pregnancy, X-ray treatment should be considered unjustifiable until the other methods of treatment have failed.

It is interesting to compare this opinion with that of M. R. Robinson,[19] who has conducted a further series of experimental studies on the effect upon fecundity and the offspring of ovarian irradiation with a castration dose of X rays. These experiments were conducted upon families of mice, with due controls, and the paper should be referred to for the details of these exposures. In addition to experiments on irradiated female mice, others were done with X-ray-castrated males, mated, at varying intervals after castration, with non-irradiated females. This appears to be a very complete and carefully conducted piece of work, and in making a summary of the results the chief point insisted on is that the temporary sterilization by X rays in women of the child-bearing age, when clinically indicated, is a safe and rational procedure.

Abortion.—An interesting paper by S. Stern[20] is based upon a series of thirty-one cases which in the course of nineteen months were given X-ray treatment with a definite view of producing abortion. The author reports all these cases in detail, and gives the reasons for adopting this method of treatment, none of the cases being undertaken except under the supervision of the gynæcological staff. The technique is described in detail, all being exposed with a high-voltage apparatus. In making the summary and conclusions it is pointed out that one advantage of this method is that, as in nearly all, if not all, of the patients it was undesirable that they should again become pregnant, the administration of castration doses of X rays did something which no other method could do.

Action on Egg-albumen.—In a paper entitled, "A Note on the Viscosity Changes produced in Egg-albumen by X Rays", J. A. V. Fairbrother[21] relates the experimental details and the results obtained. The latter are so interesting as to point to the necessity for further work on this subject. He summarizes as follows: The viscosity of egg-albumen is decreased as much as 40 per cent by an X-ray dose equivalent to 176 times an erythema dose, and this decrease is permanent; also if brought to the coagulation temperature then setting is delayed.

REFERENCES.—[1]*Brit. Med. Jour.* 1927, ii, 1406; [2]*Med. Research Council Rep.* 1927; [3]*Ibid.* 1928; [4]*Brit. Med. Jour.* 1928, i, 535; [5]*Brit. Jour. Radiol.* 1927, 316; [6]*Ibid.* 1928, 257; [7]*Jour. Amer. Med. Assoc.* 1927, ii, 1927; [8]*Bull. et Mém. Soc. méd. Hôp. de Paris*, 1928, 949, and *Brit. Med. Jour.* (Ep.) 1928, ii, 19; [9]*Amer. Jour. Roentgenol.* 1928, i, 61; [10]*Brit. Med. Jour.* 1928, i, 132; [11]*Proc. Roy. Soc. Med.* (Elec.-Ther. Sect.), 1927, Nov., 53; [12]*Brit. Jour. Radiol.* 1928, 90; [13]*Amer. Jour. Roentgenol.* 1928, i, 453; [14]*Acta Radiol.* 1928, 23; [15]*Amer. Jour. Roentgenol.* 1928, i, 1; [16]*Ibid.* 432; [17]*Ibid.* 203; [18]*Zentralb. f. Gynäkol.* 1927, Oct., 2601; [19]*Amer. Jour. Roentgenol.* 1928, i, 36; [20]*Ibid.* 133; [21]*Brit. Jour. Radiol.* 1928, 121.

RECTUM, CANCER OF.

J. P. Lockhart-Mummery, F.R.C.S.

Since the days of the Allinghams the surgery of rectal cancer has improved out of all knowledge. The operations are more extensive, the risks are much less, and the end-results are infinitely better. But surgeons are hampered by the fact that most cases are not brought to them until it is too late. In the great majority of cases extension of the growth beyond the bowel has already occurred, with involvement of the lymph glands and sometimes metastasis into other organs. Surgeons have tried to get over this difficulty by making the operation more extensive and striving to remove all the primary and secondary lymph areas. Recently a considerable amount of study has been devoted to examining the method of spread of rectal tumours, both in England and America, and it would seem that our previous views must be considerably modified. Once the growth has spread from the bowel into surrounding tissues, and the glands have become cancerous, it is very doubtful if recurrence can be prevented, whatever the nature of the operation performed. It would seem that once the lymphatic areas beyond those in the bowel wall are affected with growth, no means of removal will prevent recurrence, since cancer cells will almost certainly have spread to much more distant areas. Much of the earlier conclusions were false, because it was too hastily assumed that enlarged glands in the neighbourhood of the growth were cancerous. More careful histological examination of large numbers of such glands has demonstrated that quite often they are only inflammatory from the septic ulcerating part of the primary growth. The only satisfactory way of tracing cancer of the tissues surrounding a growth is by the careful study of large microscopic sections cut through and across the tissues.

The conclusions that we may draw from these observations is that very extensive block dissections of cancerous growths are not justified if they are accompanied by an increased mortality or mutilation. Surgeons are beginning to realize this, not only in dealing with growths of the rectum, but in other parts of the body. The tendency of surgery in treating cancer of the rectum would seem to be towards removal of the rectum by that method which gives the lowest mortality and greatest safety to the patient compatible with the complete removal of the primary growth, and to deal with any doubtful lymphatic involvement by the insertion of radium needles into the suspected or suspectible areas.

It has already been shown that very good results can be obtained as regards freedom from recurrence by such methods, and when the technique of using radium to cover the lymphatic areas has been more perfected, we shall probably see much better results in the more advanced cases than have been obtained by the most drastic operation.

F. W. Rankin[1] has published a careful study of a large number of cases of cancer of the rectum treated at the Mayo Clinic. He attempts to show that growths of the rectum can be classified in grades of malignancy on their histological appearances, but it seems very doubtful if these conclusions are justified. The histological appearances vary with the age of the tumour, and it would seem probable that if the appearances of the same tumour at different stages of its growth could be compared, it would be found that these different grades occur in all, or most, tumours at certain stages.

All the operations now commonly performed for cancer of the rectum fall into two main types: (1) Those where the whole operation for removal of the tumour is done through a perineal wound, a colostomy having been previously established at a prior operation; (2) Those where the operation is performed partly from the abdominal aspect and partly from below. There appears to be a general tendency in this country, in America, and on the Continent to follow the first type. It has the advantage of being much safer -the mortality is the lowest of any operation yet devised for removal of the rectum; it is applicable to the largest number of cases; and the results as regards recurrence are the best yet published. The operation lends itself to being standardized, which is a great advantage where a difficult operation is concerned. The second type of operation, while it gives a very complete removal, is accompanied by a much higher mortality-rate, and owing to its severity cannot be performed in the case of old patients, or those who are bad risks so that it is not applicable to a number of patients who can be dealt with by the first type. It remains the only method for growths at the rectosigmoid junction, as these cannot be dealt with by the perineal route alone. There is no proof that the very small extra amount of tissue removed by this method confers any advantages from a recurrence point of view.

The Coffey operation, which is a modification of the more usual type of abdomino-perineal operation, does not appear to have any advantages, unless possibly that it is less difficult to perform. It often results in sloughing of the bowel, and the method of draining the large cellular space in the pelvis through the abdominal wound is bad. Also leaving forceps on a stump of bowel with the handles projecting through the abdominal wound would seem quite unsound.

Judging from the published papers during the year, it would appear that the American surgeons are divided between the two methods, perineal resection and the combined method. On the Continent the method by perineal resection seems to be in greatest favour. Damon Pfeiffer,[2] in a long and carefully considered paper in which he reviews the whole literature of the surgery of rectal carcinoma, comes to the conclusion that any definite decision must await a fuller publication of the end-results of the present methods, and that it is probable that the best method has not yet been evolved.

During the year a most valuable report on cancer of the rectum has been issued by the Ministry of Health. It deals with an analysis of nearly six thousand cases collected from the literature of ten different countries. The main conclusion arrived at from a careful study of this large number of cases was that patients come to the surgeon too late. The report is not of much help in deciding the type of operation which gives the best results, as it includes cases from the very beginning of rectal resection for cancer, and makes no distinction between the modern type of operation and that of thirty years ago. This period covers the whole development of such operations, and the report is too comprehensive to be of value in adjudicating upon the present methods. Sir George Newman, in the preface, draws some very useful conclusions from the report, which will help the development of this branch of surgery if they are acted upon. His words are as follows: "In the meanwhile, there are ample indications as to the lines along which progress may be made in the control of cancer at this site—namely: (*a*) The recording in future cases by the surgeons concerned of full details, such as are indicated in this report, in order to provide them with those complete data upon which alone the rational treatment of the disease may be founded; (*b*) The education of the public and of the medical profession in those already established facts which will conduce to discovery and treatment of the disease while there is still hope of permanent cure; and (*c*) The development by all suitable means of those facilities for diagnosis and treatment which have proved effective in the past."

The Treatment of Cancer of the Rectum by Radium Needles.—Sir Charles Gordon-Watson[3] describes the method of treating rectal growths with radium needles inserted into the growth in a regular manner so as to radiate the entire neoplastic area through an external wound. That is to say, the needles are not inserted from the bowel lumen, but from the back of the growth after the latter has been suitably exposed by operation. He regards as a suitable dose in an average case 50 mgrm. for 200 hours. The lymph areas in the neighbourhood of the growth are attacked at the same time by the insertion of radium needles. He reports a number of cases treated in this manner.

Pre-cancerous Changes in the Rectum and Colon.—The question of *adenomata* of the large bowel and their relationship to the onset of cancer has been closely studied at St. Mark's Hospital[4] for some years, and during the year several papers have appeared from other sources on the same subject. It is now a well-established fact that cancer of the rectum is often preceded by a tumour, or tumours, of a simple character; or, to put it another way, simple tumours such as polypi and villous adenomata of the bowel frequently degenerate into carcinomata. A careful study of a large number of specimens removed at operation from rectums and colons has shown that small innocent adenomata are almost invariably demonstrable in the mucosa of the bowel both above and below the tumour. In fact there is an irregularly distributed hyperplasia in the neighbourhood which appears to be constant and is followed by the

PLATE XLIII

PRECANCEROUS CHANGES IN RECTUM AND COLON

(J. P. Lockhart-Mummery and C. Dukes)

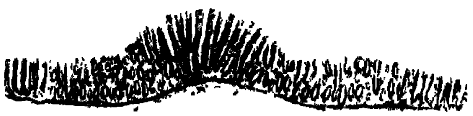
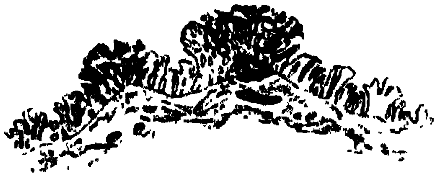


Fig. A.—Illustrating the microscopic appearance of a section showing local hyperplasia of the mucous membrane of the rectum. The epithelial proliferation is not yet visible to the naked eye.

Fig. B.—Local hyperplasia leading to adenoma. This degree of epithelial proliferation reveals itself as minute rounded elevations on the surface of the bowel, just visible to the naked eye.



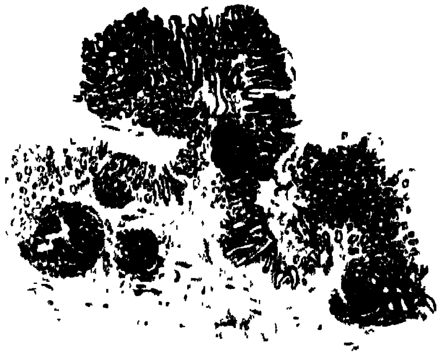


Fig. C.—Adenoma of the rectum. One of many tumours found scattered over the mucous membrane of the rectum in a case of early cancer.

Fig. D.—Malignant disease commencing in adenoma of the rectal mucous membrane. The malignant change is limited to the top and one side of this tumour, but cancer cells are to be seen also invading the submucosa (indicated by the arrows).

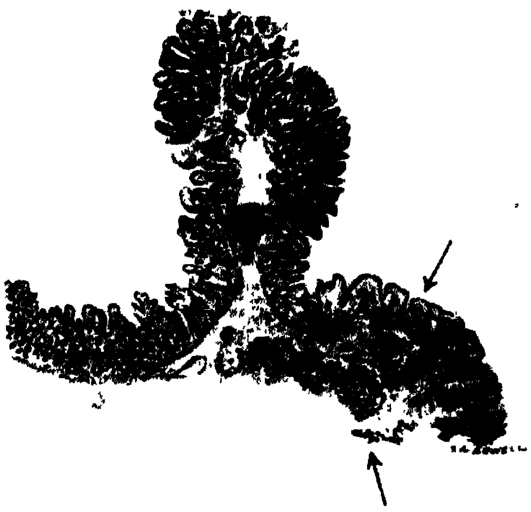


PLATE XLIV

PRECANCEROUS CHANGES IN RECTUM AND COLON—*continued*

(J. P. Lockhart-Mummery and C. Dukes)

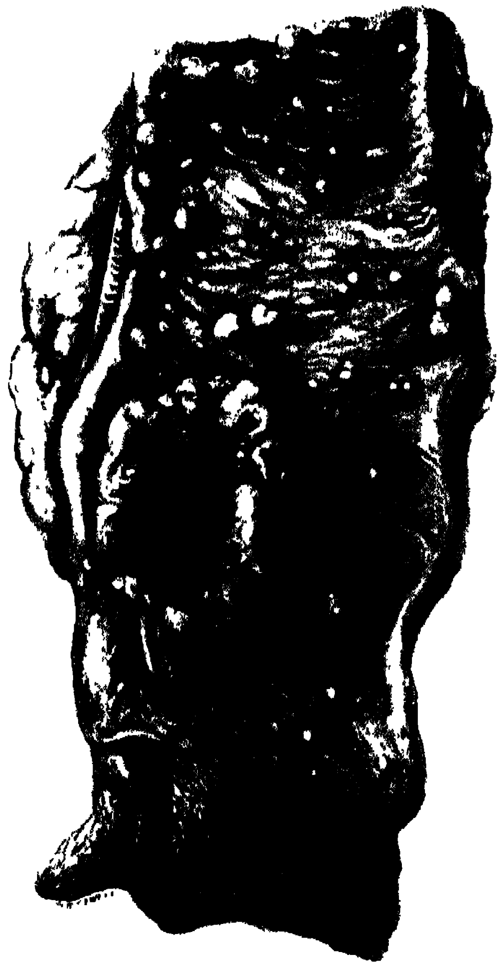


Fig. E.—Cancer of the rectum associated with adenomatosis. Note the extensive area of the bowel which is covered by the benign tumours, and the comparatively small area affected by malignant disease.

appearance of definite naked-eye adenomata. It appears that the following stages in the development of a cancer of the bowel can be traced: (1) Localized patches of hyperplasia, invisible to the naked eye but obvious under the microscope, affecting an extensive area of the bowel mucosa; (2) The appearance of a crop of adenomata scattered over this area; (3) The development of cancer in one of these adenomata; (4) Progressive enlargement of the cancer with retrogression of the hyperplastic changes and benign tumours. These changes, it is believed, are those which normally occur in the formation of a bowel cancer, but they may be spread over a considerable number of years. The changes from hyperplasia to cancer are well shown in the illustrations appended to this article (*Plates XLIII, XLIV*). According to this view carcinoma formation is an accident occurring to a previously existing adenoma. The obvious inference to be drawn from these observations is that all polypi or adenomata of the bowel should be treated as definitely pre-cancerous and removed immediately, and that the patient should be kept under observation for several years afterwards to detect and remove other adenomata which will be liable to form.

Bruce Beeler[5] reports four cases of cancer of the rectum supervening upon previously existing adenomata. Frank Yeomans[6] reports seven cases of adenomata degenerating into carcinoma, and similar cases have been reported by J. Saint,[7] Professor Reichel,[8] and J. F. Erdmann and J. H. Morris.[9]

REFERENCES.—[1]*Surg. Gynecol. and Obst.* 1928, May, 660; [2]*Ann. of Surg.* 1927, Sept., 374; [3]*Proc. Roy. Soc. Med.* 1927, Dec., 309; [4]*Surg. Gynecol. and Obst.* 1928, May, 1, and *Lancet*, 1925, i, 427; [5]*Amer. Jour. Surg.* 1927, Aug., 142; [6]*Jour. Amer. Med. Assoc.* 1927, ii, 852; [7]*Brit. Jour. Surg.* 1927, July, 99; [8]*Arch. f. klin. Chir.*, 1926, 702 [9]*Surg. Gynecol. and Obst.* 1925, April, 460.

RECTUM, PROLAPSE OF.

J. P. Lockhart-Mummery, F.R.C.S.

Frederick McCann[1] describes a new method of operating for curing prolapse of the rectum in a female. The operation is performed in the lithotomy position, and a curved incision is made surrounding the anal orifice at the front and two sides. A mesial incision is then carried forward from the centre of this incision to the fourchette, and this is prolonged on its anterior extremity forwards into each labium by dissecting up the flaps. The anal sphincter and lower end of the rectum are exposed, and the dissection is carried up the posterior vaginal wall for about two inches. The parts now exposed are the anterior portions of both levator ani muscles and the anterior portion of the sphincter. Catgut sutures are then introduced through the sphincter ani, being passed on one side from within outwards under the sphincter muscle and avoiding the mucosa, and in the reverse order on the opposite side. A number of such sutures are inserted, and when tied should have the effect of narrowing the anal orifice. Further sutures are introduced to tighten the stretched fascia over the lower end of the rectum. A number of silkworm-gut sutures are next inserted, passing through the skin and levator ani muscle on one side and outwards through the corresponding levator muscle and skin on the opposite side. After this the levator ani muscles are united by catgut sutures so as to bring them into good contact. Lastly a V-shaped piece is excised from the posterior vaginal wall and the edges are brought together with catgut sutures. These sutures should also take a grip of the levators beneath the skin. The edges are united with catgut sutures, and large silkworm-gut sutures are tied through pieces of rubber tubing to complete the operation. The object of this operation is to anchor the rectum in front and to restore the posterior pelvic floor by bringing the levator ani muscles into good contact in front of the rectum.

REFERENCE.—[1]*Proc. Roy. Soc. Med.* 1928, March, 891, and *Lancet*, 1928, i, 1072.

RELAPSING FEVER.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

An epidemic of relapsing fever in the Anglo-Egyptian Sudan in 1926 and 1927 is reported on by C. E. G. Beveridge,[1] who thinks it spread from West Africa, where the disease has been epidemic and may have originated in the return of French black troops from Europe after the war. The deaths in the Sudan are estimated at 200,000 at least, and the huge sparsely populated area involved made preventive and remedial measures very difficult, but much was done by delousing travellers at various quarantine stations, and by the isolation of cases and treatment with **Novarsenobillon.** Very heavy spirilla infections with much toxæmia were noted, and the case mortality without treatment was estimated at 60 to 80 per cent, but in those injected it was only 7 per cent. The N.A.B. injections should be given during the pyrexial periods, and are usually followed by a fall of temperature within twenty-four hours, but during the apyrexial period they may fail to avert a relapse. The dosage was 0·45 to 0·9 grm. in adults, and 0·3 in children, and 0·45 suffices and is not so dangerous as 0·9 in adults.

R. Bruynoghe[2] has dealt with the cultivation of pathogenic spirochætes, and found sugar indispensable in the media, and cultures to be of diagnostic importance, but serological methods gave unreliable results, and immunization experiments with cultures failed.

REFERENCES.—[1]*Med. Jour. of Australia*, 1928, Jan. 28, 111; [2]*Jour. of State Med.* 1928, Jan., 3.

RENAL DISEASE.

Hugh Maclean, M.D., D.Sc., F.R.C.P.
J. Forest Smith, M.R.C.P.

Estimation of Renal Function.—The importance of renal function tests to detect early lesions in the kidney has led to many efforts to obtain procedures which would give evidence of slight change in the eliminating powers of the kidney. Although for practical purposes the urea concentration, sodium chloride elimination, and water tests give sufficient information as to the broad classification of the renal condition, other tests have been introduced using substances which in the main are foreign to the organism and the elimination of which must involve mechanisms of an unknown nature. Such substances as certain dyes, sodium thiosulphate, and sodium iodide, whilst offering very interesting fields of inquiry, have not produced any deeper insight into the mechanism of action of the kidney nor into the classification of nephritis. The dye phenolphthalein has had extensive application in recent years, but sodium thiosulphate and sodium iodide have only appeared very much more recently. A. Bolliger,[1] in an interesting investigation, compared the excretions of these three substances in dogs after intravenous injection of 1 grm. thiosulphate, 1 grm. sodium iodide, and 6 mgrm. of phenolphthalein in 10 c.c. water; and he concludes that the $Na_2S_2O_3$ test is a specific quantitative test for experimental renal insufficiency and that it gives essentially the same information as the dye test. The sodium iodide test is regarded as valueless in tests of renal function.

The chemical investigation of the blood has yielded much more of interest than that of the urine. Variations in blood urea, uric acid, creatinine, phosphorus, calcium, and certain derivatives of indol have led to a good deal of advance as to the fundamental questions of selective elimination, and there has been an increase in agreement as to the blood picture presented in conditions of pre-uræmia and uræmic coma.

Calcium has received a good deal of attention in regard to the symptoms of localized tremors and twitchings associated with the terminal stages of azotæmic nephritis. These phenomena are found to be accompanied by a fall in blood calcium, from the normal value of 10 to 11 mgrm. per cent to values around 7 to 8 mgrm. per cent. De Wesselow,[2] and V. C. Myers *et al.*[3] have given illustrative cases and have discussed its prognostic significance. These findings are of great interest when considered in conjunction with the well-known fall in blood calcium which occurs in parathyroid tetany, and the fall in blood calcium following intravenous injection of phosphates. The question arises as to whether the fall in blood calcium is actually the cause of the nephritis twitchings, etc., and, further, what relation the fall in calcium has to the phosphorus content of the blood of a nephritic. As to this latter point, it is well known that in nephritis there seems a definite increase in the acid-soluble phosphorus of the blood above the normal level of from 3 to 6 mgrm. per cent. Thus, in chronic nephritis one frequently meets with values of phosphorus three to four times the normal, and values of calcium as low as 7 mgrm. per cent. There is, however, no uniformity in the degree of rise of the one and fall of the other—that is to say, the retained phosphorus has not always the same effect on the blood calcium. Further, in some cases where the calcium is so low that one would expect convulsions, one may find no such phenomena, and it is therefore suggested that it is the attendant acidosis which prevents them, for it is known that the administration or injection of salts producing conditions of uncompensated acidosis will prevent convulsions. Thus ammonium chloride or calcium chloride can prevent the convulsions following parathyroidectomy, and the alkalotic manifestations of excessive overbreathing or ingestion of sodium bicarbonate. The recent use of high fatty diets in the treatment of epilepsy is due to the fact that such diets produce acidosis.

The value of blood inorganic *phosphorus* as a prognostic sign in chronic nephritis has been well established. For example, Myers *et al.* found that, out of twenty-nine cases in which the inorganic phosphorus varied between 7 and 25 mgrm. per cent, twenty-seven of them died in a relatively short time. Blood-calcium as a prognostic sign is not so easy to decide upon, but F. Lebermann[4] puts it in a negative way and states that in cases where there is any doubt about renal sufficiency a low value strengthens the uncertainty.

V. C. Myers,[5] in 1919, stated that a blood *creatinine* above 5 mgrm. per cent definitely indicates a serious prognosis, and in such cases death almost invariably follows in a short time. In a more recent communication[3] he again emphasizes this matter, and states that it is as reliable as the blood inorganic phosphorus. F. S. Patch and I. M. Rabinowitch,[6] as a result of analysis of 5000 cases to compare the retention of urea and phosphorus in nephritic bloods, found that high urea values are often associated with normal or nearly normal creatinine values, but uræmic symptoms did not usually occur in the presence of normal creatinine contents. They also doubt whether the figures usually given as creatinine are really due to this substance—a suggestion which was previously made by Benedict and Behre[7] in 1922 as a result of an examination of the properties of the chromogenic substance in the blood which is said to be creatinine. Patch and Rabinowitch conclude that blood urea alone cannot be relied upon in prognosis, but must be considered in conjunction with the blood 'creatinine'.

The amount of retention in the blood of *indol bodies* related to indican has recently been used in the recognition of chronic renal disease. K. Machold[8] describes a simple technique which he recommends for general use. Equal parts of serum and 20 per cent trichloracetic acid are shaken up, and the mixture is filtered; 1 c.c. of filtrate is taken in a narrow test-tube, and 1 c.c. concentrated sulphuric acid is run down the sides of the tube, thus forming a layer below. Normal sera give practically no colour with this test; nephritic sera give a red to purple colour. It can be shown that this colour is roughly proportional to the degree of indicanæmia, but it is improbable that it is due only to this factor. It is claimed that this test is at least as valuable as the estimation of non-protein nitrogen in the diagnosis of chronic nephritis; but more evidence is necessary before this conclusion can be agreed upon. The test is certainly simple to carry out, but it is not as yet quantitative, and it is not certain that it may not be subject to variations as a result of substances which may be of no significance.

Uræmia in Nephritis. The problem of the causation of uræmia in nephritic conditions is as yet unsolved, but certain very interesting findings have been published by E. Andrews.[9, 10] By special experimental methods he has been able to produce a condition identical with uræmia in the presence of perfectly normal kidneys. Further, he shows that suppression of urine is due, not to deficiency of the kidney's power to eliminate water, but to the firmer combination of water with the blood and tissue colloids. It is well known that it is not the retention of nitrogen nor the suppression of urine which gives rise to the uræmic syndrome. Andrews therefore seeks for further sources of information by examining the nature of the protein which is eliminated as a result of nephritis and uræmia experimentally induced. Using extremely delicate precipitative reactions with sera of animals sensitized to different tissue proteins, he shows that in the early stages of nephritis the protein in the urine is derived from the degeneration of the large parenchymatous organs, e.g., the *liver* and spleen, and in the later stages blood proteins are also found in the urine, but at no stage were the proteins of muscle or kidney demonstrable. From these and other considerations he concludes that "it is probable that nephritis is not a renal disease but a disturbance of the normal metabolism causing a disintegration of the great parenchymatous organs, which allows the protein to leak into the blood and pass through the kidneys as foreign proteins." This sort of view will not at first appeal to the clinician, but it indicates the lines along which investigation is proceeding. It is, however, interesting that Izod Bennett in his Goulstonian Lectures[11] describes a case of cystic disease of both kidneys leading to death from uræmia in which neither œdema nor high blood-pressure was a marked feature, nor was there evidence of renal inflammation. He goes on further to point out that one is driven to the conclusion that œdema occurring in renal disease is to be referred to other tissues than the kidney being affected. The concept of renal disease in the kidney is thus being made much broader, and classifications based merely on findings in the kidney are likely to disappear very soon.

Foci of Infection as a Cause of Nephritis.—In spite of what has been said in the previous paragraph, one must still search for factors which have commonly been regarded as of etiological importance in nephritis, particularly infection foci. The *tonsils* have been considered of prime importance as probable sources of toxins which might give rise to renal affections. V. Kollert and E. Suchanek[12] consider that all cases of nephritis have an inflammatory focus somewhere, and adduce as evidence of this: (1) Cases of nephritis in which, post mortem, bacteria of previous infections were still isolated: (2) More rapid sedimentation of red cells in chronic glomerulonephritis; (3) Changes in the leucocyte blood picture indicating a defence mechanism.

As a first attack on such infective foci they recommend treatment of the tonsils, and point out that unsuccessful results in the past have been due to the fact that treatment has not been directed to the whole of Waldeyer's ring as well as the tonsils themselves. The three methods of dealing with infected tonsils are (1) tonsillectomy, (2) drainage, and (3) attempts to limit spread of infection by local treatment—e.g., by radiation with X rays, local applications, etc. Taken altogether the latter two methods have been disappointing. Tonsillectomy in relation to nephritis should, however, only be undertaken (1) if there is evidence of a considerable amount of good functioning kidney substance; (2) if there is not a great deal of peritonsillar inflammation; (3) with special precautions not to disseminate infection, as, for example, use of very delicate forceps to avoid pressure on the glands, and application of bactericidal dyes to the surrounding areas

In a series of cases of nephritis reported by N. M. Keith[13] there occurred thirteen during the last seven years in which all evidence of the disease disappeared, and in nine of these tonsillectomy was performed, which is at least presumptive evidence of a beneficial effect of this procedure. In the same communication Keith draws attention to the undesirability of adopting a pessimistic attitude towards the progress of a nephritic. He points out that many cases go on to spontaneous recovery, and finds that 50 per cent of his favourable cases of acute glomerulonephritis contracted in the war went on to complete recovery. Other reports also bear out the view that this form of nephritis can be a self-limiting disease, and even cases of subacute and chronic disease may also reach a point of arrest.

Pregnancy and Kidney Disease.—The toxæmia of pregnancy associated with albuminuria, casts, œdema, temporary visual disturbances, and hyperpiesia is normally regarded with optimism if the acute phase is safely passed. Evidence has, however, been brought forward recently that in a considerable percentage of cases permanent damage remains which must be specially considered in the future life of the mother. Thus F. E. Clow[14] states that the permanent effects which frequently remain concern the cardiovascular and cardiovascular-renal systems; ten out of twenty-eight cases which had experienced severe toxic pregnancies showed evidence of renal damage, with low-specific-gravity urine, albuminuria, low excretion of phenolsulphonephthalein, and poor water excretion. (Clow gives no figures in this paper.) This author recommends the avoidance of further child-bearing unless the return to health after the previous toxæmia is certain. G. F. Gibberd[15] brings forward evidence that recurrence of albuminuria of pregnancy is much more frequent than is usually supposed, and that this fact points to a residual renal damage, in fact that chronic nephritis may arise entirely as a result of pregnancy kidney. The evidence adduced by Gibberd is almost entirely of a clinical nature, and, as such, will require the more exact data afforded by quantitative methods for satisfactory confirmation.

Decapsulation of Kidney for Bright's Disease.—J. S. Craig[16] describes a case of Bright's disease which, following treatment by decapsulation of both kidneys, showed what appeared to be complete recovery. The case was diagnosed clinically and chemically as subacute nephritis, and two years after operation the patient shows no evidence of recurrence—a result which is of great importance in view of the lack of unanimity as to the value of this operation.

REFERENCES.—[1]*Arch. of Internal Med.* 1928, May, 642; [2]*Quart. Jour. Med.* 1923, July, 341; [3]*Arch. of Internal Med.* 1926, Feb., 233; [4]*Wien. klin. Woch.* 1928, May 17, 695; [5]*Amer. Jour. Med. Sci.* 1919, May, 674; [6]*Jour. Amer. Med. Assoc.* 1928, i, 1092; [7]*Jour. of Biol Chem.* 1922, May, 11; [8]*Wien. klin. Woch.* 1928, March 29, 447; [9]*Arch. of Internal Med.* 1927, Oct., 548; [10]*Jour. Amer. Med. Assoc.* 1928, i, 539; [11]*Lancet,* 1928, i. 741; [12]*Wien. klin. Woch.* 1928, May 3, 620; [13]*Canad. Med. Assoc. Jour.* 1928, May, 515; [14]*New England Jour. of Med.* 1928, April 5, 351; [15]*Proc. Roy. Soc. Med.* 1928, March, 831; [16]*Glasgow Med. Jour.* 1928, July, 40.

RENAL RICKETS. (*See* RICKETS.)

RETINA, AFFECTIONS OF. (*See also* EYE AFFECTIONS, GENERAL.)

Lt.-Col. A. E. J. Lister, I.M.S. (retd.).

Treatment of Detachment of the Retina.—Sir W. T. Lister[1] pleads for a careful study of these cases before treatment is adopted. He says it has been too much on a routine plan for all cases. Those with a hole in the retina are practically hopeless as regards treatment, which should not be urged in such cases unless it is the only eye and as a last clutch at the straw of hope. The greatest chance lies in the exudative cases where the retina is pushed in by albuminous fluid poured out into the inter-retinal space. Here by treatment we may hope to allay any inflammatory process which is taking place, to help in the absorption of exudate, or to drain the inter-retinal space.

The difficulty, however, is to make an exact diagnosis as to the cause in actual practice. This is not often possible. Often there is no clue to the mechanism of detachment. This is so in the bulk of the traumatic and myopic cases. Such cases, till our knowledge improves, should be given the benefit of the doubt, and treated. Treatment should be very thorough if undertaken at all. Nothing that is known to be useful should be omitted from the course of treatment—so as, to use the author's own words, "to protect him from the poisoned darts of some who, at a later date, because some one measure—such as inunction of mercury or subconjunctival injection—has not been tried, may suggest that valuable time has been wasted, and that the treatment was valueless". The author therefore attacks the condition from every point of view, local and general: absolute rest in bed, constitutional treatment, absorptive treatment, etc.; the usual local treatment is employed for the eye, and subconjunctival injections are given. If after a fortnight no improvement results, scleral punctures are tried, with or without making an adhesive spot to which the retina may become glued.

[In the discussion which followed, various cases were quoted, which in the reviewer's mind corroborate the opinion of the author that every method of treatment should be tried. It was pointed out that cases in which a cure has resulted may recur. One did so after a railway journey. If the patient has only one eye, this case is worth remembering, as pointing to the need for care of the affected eye. One author had seen three cases in which double detachment of the retina occurred in the albuminuric retinitis of pregnancy. This is a class of case of special interest to the practitioner (see MEDICAL ANNUAL, 1928, p. 156, in this connection). Every practitioner will undoubtedly agree with Sir William Lister's plea for thorough treatment. A patient recently brought the reviewer a cutting from the daily press about a treatment which had not been tried, and asked if he could have it also. It is quite natural in such cases that well-meaning, if ill-advised, friends should suggest anything they hear of. Even if the remedies fail to relieve the condition, they serve to protect the patient's peace of mind in the years of darkness which may follow. This in itself is a real gain.—A. E. J. L.]

J. Gonin[2] reports a further series of ten cases of detachment of the retina in which five were cured by operation. The remarkable point about his cases is that he claims to have caused tears in the retina to close by means of his method of treatment. One case, of which an illustration is given, had no less than three tears in the retina. The author states that these cases were seen by several other oculists, who are able to testify as to the detachment, the presence of tears in the retina, and the subsequent re-attachment of the retina with closure of the tears in it. The method of operation is **Cauterization.** Details of the exact technique are not given, but will be in a future paper.

Hæmorrhagic Neuroretinitis of Dental Origin.—A. Terson[3] says that in the past too many teeth have been unnecessarily removed. He says many theories

PLATE XLV

RETINITIS WITH MASSIVE EXUDATES

(L. W. JONES)

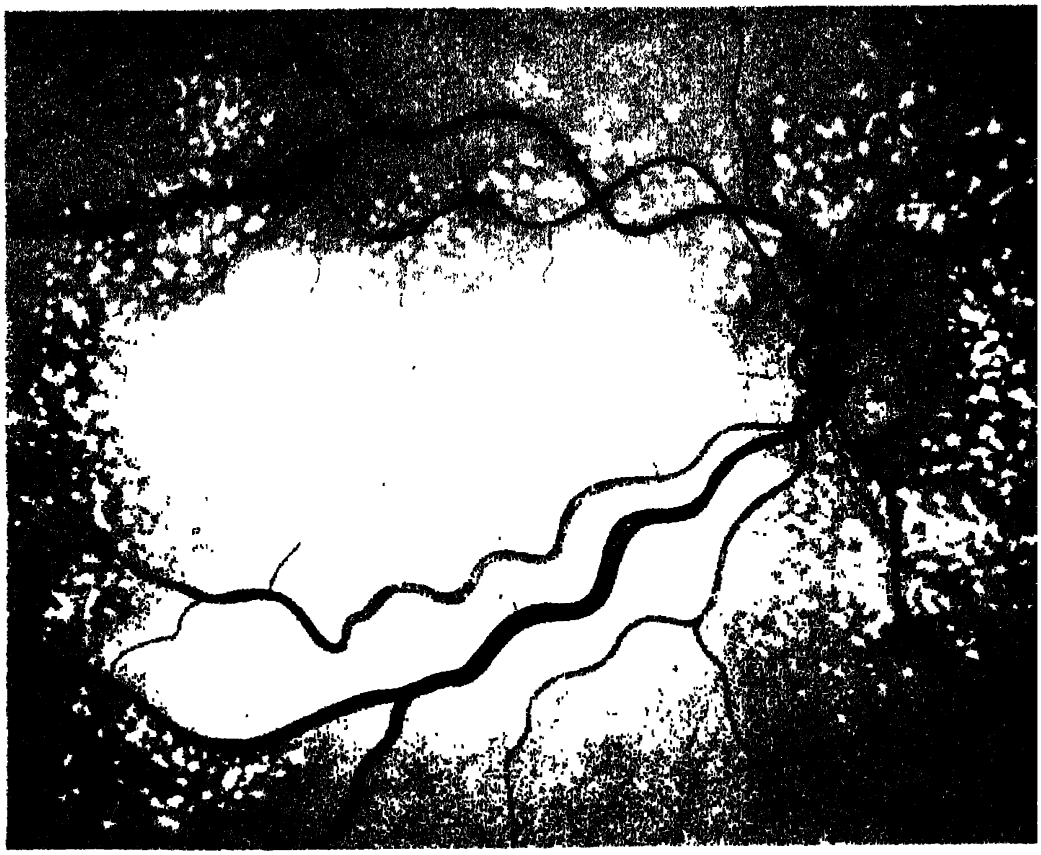


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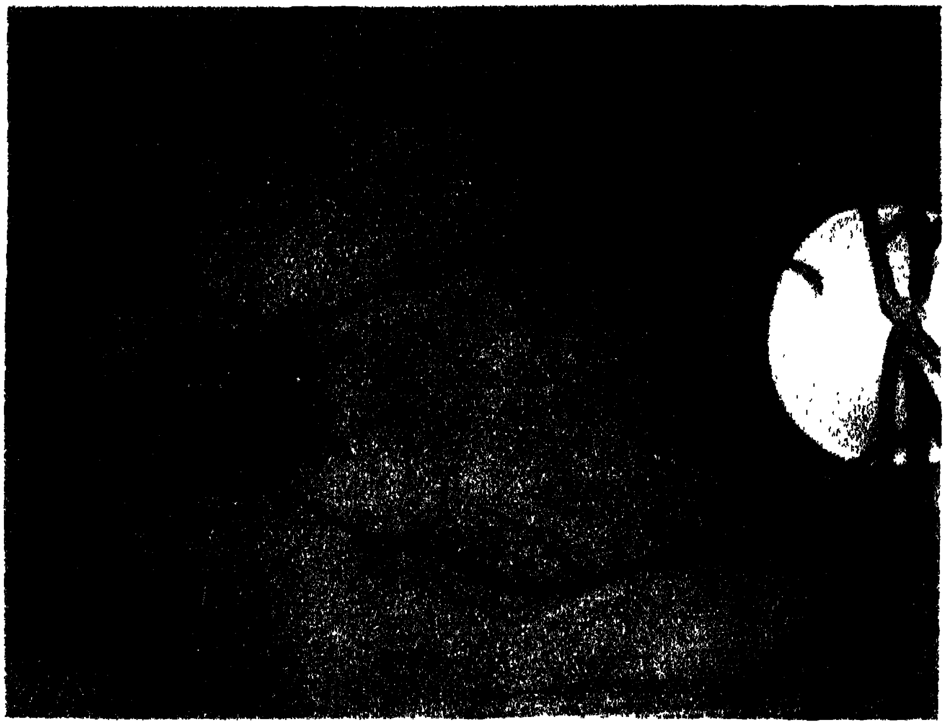
PLATE XLVI

FAMILIAL ROSETTE FIGURE OF THE MACULA

(A. M. BROWN)



By kind permission of the 'American Journal of Ophthalmology' as to dental infection may be put forward, but the facts which are not capable of being controverted are those of clinical observation. The case he gives in detail, here summarized, seems clearly to be of dental origin. Mrs. S., age 22, accompanied her husband on a professional visit to an oto-laryngologist. As she complained of defective vision for two days, he sent her to the author. The left eye was normal. The right eye showed an intense hæmorrhagic neuro-retinitis which reduced vision to counting fingers at 30 cm. The nasal sinuses were normal. On inquiry as to the teeth the patient became agitated. It appeared then that six weeks before, she consulted her dentist about the second right upper bicuspid, which was very much decayed. It had caused her recurring attacks of pain. She desired to have it extracted, but the dentist wished to save it by a new method. The tooth had apparently had the nerve destroyed (devitalization) and an amalgam filling inserted. It was tender on pressure. It had never been comfortable and mastication caused pain. It was extracted. The next day after this, vision improved to $\frac{1}{10}$th. Three weeks after it was normal and a slight pallor of the disc alone remained. [In the absence of any other cause, one can only agree with the author that the condition was caused by the tooth. The author rightly points out the danger of retaining infected teeth. Most medical men have grown a little tired of 'dental sepsis' as a focus of so many maladies. It has seemed useful, however, to the reviewer to bring forward such a clear case as this to serve as a reminder that a very severe condition may be caused by a tooth which was apparently dealt with by an expert dentist.—A. E. J. L.]

Retinitis with Massive Exudates (Coat's Disease).—L. W. Jones[4] describes a case of the above-mentioned condition, which is illustrated in *Plate XLV*. It occurred in an Italian boy, 9 years old. The school doctor had told him he had poor vision in the right eye, and that he should go to be examined for glasses. He was a well-nourished lad, and an exhaustive medical examination by a physician revealed no focus of infection of any kind. Coats, who first described the condition in 1908, failed to discover any probable etiology. The affection usually occurs in young males in apparently good health. The condition is not a common one. Pathologically, Coats found the white mass was due to a disintegrating hæmorrhage, seen through a retina which was thickened and infiltrated with leucocytes.

Familial Rosette Figure of the Macula.—A. M. Brown[5] found the curious appearance illustrated in *Plate XLVI* in four out of five children examined belonging to one family. The father and mother both had normal eyes. The fundus condition is described as follows: Disc fairly sharply outlined. Surface of disc moderately pale. Capillarity distinct. Vessels of good calibre. In the macula is a raised figure in the centre of which is a dark dot, which is undoubtedly the foveal area. The mass seems to be composed of reddish deposits not unlike the colour and setting of the seeds of a red raspberry. The left eye had a similar figure, but not quite so many spokes. General physical examination by a physician was entirely negative. There was considerable diminution of the vision in most of the cases, but not in all.

A Photographic Study of Holes in the Macular Region and Associated Changes.—A. J. Bedell[6] says: "We are not unmindful of the fact that an actual hole in the macula has not been demonstrated pathologically, but there are many reasons for this, the most important one being that eyes so affected are seldom subjected to pathological section." He reminds us, however, that depressed areas are known to occur, and he includes in his article several photographs of a number of such areas with and without surrounding pathological changes.

A Case of Bilateral Blindness during Labour due to Spasm of the Retinal Arteries.—P. S. Plitas,[7] after discussing the history of this condition, relates his case. A perfectly healthy woman of 40 years of age started labour in the morning of March 19, 1924. At about five o'clock in the evening she complained to the accoucheur that her vision became dim during the pains, but improved in the intervals between them, not, however, returning to normal. Next morning at 8 a.m. vision was entirely lost. Seen by the author then, the pupils were dilated, did not react to light, movements of the globe were normal, vision reduced to perception of light. Ophthalmoscopically, the outlines of the optic discs were sharp, the discs pale, however, and the retinal arteries markedly contracted; the retinal veins were contracted also, but a little less than the arteries. At midday the edges of the disc were no longer visible and there was slight œdema of the retina. Immediate delivery was advised and carried out. At 5 p.m. the pupils began to react to light and the patient could count fingers. Three days later the eyes were in every respect normal. The author considers the condition as due to reflex spasm and not to toxins, the transient nature of the symptoms being in favour of the former. [A knowledge of the existence of this class of case, though rare, may be of great help to a practitioner seeing such a case for the first time. It is interesting to note that a knowledge of the condition evidently gave the author sufficient confidence to wait four hours, as the patient was in such a state that a less experienced man would probably have counselled immediate delivery at 8 a.m. when first seen by the oculist.—A. E. J. L.]

Retinal Hæmorrhages after Blood Transfusion.—G. A. Schaly[8] says that in two cases of pernicious and two of aplastic anæmia blood transfusion was resorted to. The patients immediately or a short time afterwards complained of impairment of vision. Numerous retinal and pre-retinal hæmorrhages were seen ophthalmoscopically. Two cases died, and the hæmorrhages were found to be pre-retinal, in all layers of the retina. Three similar cases have been reported. The prognosis as regards recovery of vision appears serious. The hæmorrhages seem to have arisen in connection with the transfusion, perhaps from the slight increase of blood-pressure.

REFERENCES.—[1]*Brit. Med. Jour.* 1927, ii, 1127; [2]*Ann. d'Oculist.* 1927, 817; [3]*Ibid.* 616; [4]*Amer. Jour. Ophthalmol.* 1928, Jan., 1; [5]*Ibid.* March, 190; [6]*Ibid.* 1927, Dec., 890 (abstr. *Surg. Gynecol. and Obst.*); [7]*Rousski Ophtal. Jour.* 1926, No. 7 (abstr. *Rev. gén. d'Ophtal.* 1927, 446); [8]*Klin. Monatsbl. f. Augenheilk.* 1926, 350.

RHEUMATIC INFECTION IN CHILDREN. *Reginald Miller, M.D., F.R.C.P.*

The number of papers published on this subject during the year shows that there is no lessening in the amount of thought and work which juvenile rheumatic infection has recently attracted. Chief among the contributions to be mentioned must be placed the three Lettsomian Lectures delivered by F. J. Poynton.[1] We are fortunate to have at this juncture an opportunity of hearing at some length the views on some of the more advanced and difficult problems of rheumatism of one who is so widely recognized as the chief authority on the disease. The first lecture dealt with the correlation of the pathological lesions of the heart with other rheumatic manifestations, and in it Poynton gave a wonderfully satisfying sketch of juvenile rheumatism as a disease, and portrayed the processes by which clinical and pathological research had established and elaborated our clinical conception of the disease. The second lecture entered a plea for basing the study of heart disease as far as possible upon its development in the young, and here with a wealth of illustration from his own experience the lecturer gave a fascinating study of the early stages of rheumatic carditis. In the third lecture matters concerning the treatment of rheumatic heart disease were dealt with. On the important question of the value of **Tonsillectomy** in rheumatic children, he said: "So far, I think, the balance is in favour of the opinion that the removal of unhealthy tonsils by enucleation tends to diminish the frequency and severity of further attacks, even if it does not prevent them." [I believe I am right in saying that this opinion goes a little further in favour of operation than that hitherto expressed by Poynton. —R. M.] Notice will doubtless be taken of what the lecturer said on the subject of the treatment of acute carditis by '**Tolysin**', a cinchonic acid preparation. He claimed that it was considerably less dangerous for use in serious cases than salicylate, but he was not too encouraging on its potency as an anti-rheumatic remedy. The lectures were so full of suggestive points which cannot be dealt with here, that no one interested in the subject should fail to study them carefully.

At the Bath Conference on Rheumatic Diseases[2] a commendably large amount of time was devoted to the subject of juvenile rheumatism. Papers were read on many of the most important aspects of the rheumatism problem.

Having mentioned these publications of outstanding importance, which really require individual study, we may pass to the review of the work done on the various aspects of juvenile rheumatism.

PREDISPOSING CAUSES.—The class-incidence of juvenile rheumatism seems to show clearly that environmental factors are of enormous importance in the large-scale production of the disease in children; but when we come to closer grips and endeavour to dissect out the various factors at work and try to evaluate them accurately, we find opinions are very varying amongst those who have given the subject attention; indeed, the stage is set for healthy controversy. The first point at issue is this: Does environment produce rheumatism in any child if the environmental factors are accurately set; or is there some type of child which can be studied, recognized, and labelled, who is in some peculiar way predisposed towards the infection? Poynton[1] lays stress on the importance of a rheumatic heredity, but A. P. Thomson, studying this question afresh for the B.M.A. Committee's first report,[3] was unable to trace any real hereditary influence of moment. J. N. Dobbie[4] has a great belief in a rheumatic diathesis. He thinks that environment debilitates the child's health, but the nature of the disease it develops (e.g., rheumatism as opposed to tuberculosis) is determined by its diathesis. C. W. Vining[5] speaks boldly of the 'pre-rheumatic child', and A. Dingwall Fordyce[6] goes some of the way with him. Both Vining and M. Elmslie[7] lay stress upon a deficiency of vitamin B as lowering the resistance to rheumatic infection. The opposing view, with which the reviewer agrees, is that the environmental factors, if properly set—if, in modern parlance, they 'click'—are sufficient to set up rheumatism in any child; and, further, that the children described as those predisposed towards the disease, whether by heredity, diathesis, nutrition, and so on, are not in reality pre-rheumatic children, but are children already infected with the disease although only in a form which may be called 'latent'.

A second matter of controversy concerns the actual nature of the environmental factors at work. Are they merely those of poverty; is rheumatism, as J. A. Glover[4] thinks, and Dobbie[4] states, "largely the expression of the poverty of their homes"? Thomson originally stated that this was not the case, and the B.M.A. report followed him in regarding rheumatism as a disease of the poor but not a disease especially of the poorest. At present I agree with the latter view. There is some factor at work other than mere poverty and its associations. I have laid stress on the possibility of damp homes[4,8] being the extra factor tending towards rheumatic infection.

Bacterial Factor.—A fascinating paper was read at Bath by C. F. Coombs[9] dealing with the method of bacterial infection as traced by prolonged histological examination of rheumatic cases. Amongst other points he laid much stress upon the 'thin stream' of infection that takes place in juvenile rheumatism, rather than inoculation by massive doses. This explains much that we know to be true clinically in this disease, and the paper is worth careful study.

Rheumatic Pneumonia.—A striking paper on rheumatic pneumonia, or, as he prefers to call it, the 'rheumatic lung', comes from A. E. Naish.[10] In older works much was said about rheumatic pneumonia, but of late years it has been rather dropped, as it seemed doubtful if pneumonia were one of the true rheumatic manifestations. Yet signs at the bases of the lungs (usually left) are common enough in rheumatism; and particularly in connection with severe carditis, often with pericarditis, signs suggestive of pneumonia are to be noted. Naish, reopening the whole question, brings pathological evidence to show that in some of these instances real pneumonia (not merely collapse or congestion) is present, and that histologically the pulmonary lesion shows the same peculiar proliferative reaction as is so characteristic of rheumatic infection. He notes that the consolidation may spread very rapidly through the lungs, but that it produces little respiratory distress unless it is very extensive, while the temperature, if salicylate is being given, may be little, if at all, affected. In view of the histopathological evidence produced in this paper, it seems hardly possible to doubt that the lesions described by Naish are true rheumatic lesions. (*See also* LUNG, RHEUMATIC.)

TREATMENT.—The removal of diseased tonsils in rheumatic children by **Tonsillectomy** is certainly an attractive line of treatment on theoretical grounds. There is no other recurrent or chronic disease closely associated with repeated sore throats in which there is now any hesitation in removing diseased tonsils. It will be remembered that the first report of the B.M.A. Committee attempted to show that active rheumatism in tonsillectomized children tended to run a modified course, that uncomplicated chorea was its chief manifestation, and that the heart tended to be spared. I have quoted above the opinion passed this year by Poynton on this matter. Others have also mentioned it. G. Bourne[11] evidently favours the procedure, but is impressed with its possible dangers. He states that these can be overcome if the infection is sufficiently quiescent and **Salicylate** is freely given before and after the operation. My own practice confirms this view. If the child is operated on before it leaves the hospital, after an acute attack has subsided and while it is under observation and treatment, the danger seems practically nil. It is, perhaps, another matter to send for a rheumatic child who has been waiting at home for several weeks for tonsillectomy, and proceed to operation without adequate previous observation. In such cases there is a danger lest the operation be performed just as an attack is brewing. K. D. Wilkinson and A. G. Ogilvie[12] also regard tonsillectomy as an advisable measure. W. H. Robey[13] advocates operation in resistant cases without awaiting complete subsidence of the infective activity.

J. C. Small,[14] in an abstract of an article communicated to the Bath Conference, reports on the effect of treatment by an **Antiserum** of *S. cardio-arthritidis* of 232 cases with very favourable results. He advocates the use of a **Vaccine** after the serum has caused subsidence of the acute symptoms. Lazarus Barlow[15] is working on the same lines in England. G. Bourne[11] reports unfavourably upon vaccines, protein shock, intravenous flavine, and intravenous gentian-violet. He also notes that artificial sunlight may do harm.

The question of the length and severity of the rest required after an attack of rheumatic carditis is a difficult one. It is surely one in which "the golden rule is that there is no golden rule". Poynton discusses this matter in his third Lettsomian lecture. It is quite clear that rest may be unduly long and unduly strict. It is the complete quiescence of the infective activity that is the factor of chief importance.

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RHEUMATIC LUNG. (*See* Lung, Rheumatic; Rheumatic Infection in Children.)

RHEUMATISM, ACUTE.

Ivor J. Davies, M.D.

D. Seegal and B. C. Seegal[1] have studied the epidemiology of rheumatic fever as shown by its annual incidence in some hospitals in the United States and Canada. The yearly admission rate is greater in the Northern than in the Southern regions of the Continent.

In twelve out of fifteen hospitals supplying data for an adequate period of time, the average annual frequency of rheumatic fever previous to 1918 is greater than that subsequent to 1918. Since the year 1918 the disease has not shown a uniform tendency to decrease in frequency in the hospitals of this series. Their figures for the final two years of the study, 1924 and 1925, demonstrate an increased rate of rheumatic fever in some of the hospitals of the series.

M. Young[2] contributes some observations on the mortality from rheumatic fever and heart disease in London, and submits the following conclusions: Assuming the rheumatic fever mortality-rate to be an approximate index of rheumatic prevalence, there is a suggestion that the local incidence of the disease has a slight but direct relation to the social status of the metropolitan areas, and shows a general tendency to be more common in the areas where the conditions of life are least favourable. The mortality from heart disease at the ages in which the great majority of the cases are undoubtedly rheumatic in origin shows apparently a still closer relationship than the prevalence of rheumatism to those environmental circumstances implied by difference in general social status. There is a suggestion that the mortality from cardiac disease in females is more closely related to environmental conditions than in males, but whether this is real or not, and, if real, whether it is attributable to a more continuous and prolonged exposure of the female population to deleterious influences in unhealthy homes, is a question on which it is difficult to hazard an opinion.

References.—[1]*Jour. Amer. Med. Assoc.* 1927, July, 11; [2]*Lancet*, 1927, ii, 1069.

RHEUMATISM, CHRONIC. (*See* Arthritis and Rheumatism, Chronic.)

RHINITIS, VASOMOTOR. (*See* Nose, Diseases of.)

RICKETS.

Reginald Miller, M.D., F.R.C.P.

Since Glisson's time there has been much controversy over the subject of rickets. First looked upon as a primary bone disease, and complacently regarded as such for two and a half centuries, it sprang into prominence again some fifteen years ago when the researches of Findlay, Hopkins, and others showed that the disorder is really a generalized one, capable of attacking every system, though the bony skeleton is invariably affected sooner or later. The race of 'vitamins' has increased and multiplied during the last ten years, and ideas on their uses and abuses have undergone wide variations. A great deal of experimental work has been carried out, mainly in England and America, on the isolation and differentiation of these vitamins, and the results tend to show that the matter is not quite so simple as it seemed in the days when the absence of vitamin A was regarded as the whole story. Closely connected with the study of vitamins is that of ultra-violet rays and their effects in rickets, and a large bibliography is rapidly growing up about this subject.

Two recently published lectures by Leonard Parsons[1] admirably summarize the present state of our knowledge of rickets. Approaching the subject from the aspect of chemistry, he discusses the theory of defective phosphorus absorption, together with that less prevalent view, held by Findlay and others in Glasgow, that the essential error is a defect in calcium absorption. In his own opinion the maintenance of a correct calcium–phosphorus ratio in the serum is of greater importance than the actual concentration of either, and in support of this view he observes that when this balance is upset, as in phosphorus retention due to renal disease, rickets in fact occurs, of the low-calcium type, although the absorption of both elements is normal. Excess of either calcium or phosphorus in the diet is accompanied by retention of the other element in the intestine, presumably in the insoluble form of calcium phosphate, and in order to ensure adequate absorption of both the diet must contain them not only in sufficient quantity but in correct proportion; these two requirements are met by the ingestion of a pint of milk a day.

Mechanism of the Deposition of Calcium Phosphate as Bone.—" This," writes Parsons, " is a somewhat complicated problem, but viewed in its simplest terms we may, with Howland, regard the serum and circulatory fluids as normally saturated or supersaturated solutions, in which the calcium phosphate of bone is in equilibrium with the dissolved salt and this in turn with calcium and phosphate ions. This relationship can be expressed thus :—

$$[Ca^{++}]^3 + [PO_4^{\equiv}]^2 \rightleftarrows Ca_3(PO_4)_2 \rightleftarrows Ca_3(PO_4)_2$$

Ionized. In solution un-ionized. Solid in bone.

An increase in calcium or phosphate ions will cause the reaction to proceed to the right and result in the deposit of bone, whereas a decrease in concentration would result in some of the solid calcium phosphate in bone going into solution, the reaction proceeding to the left. According to mass action law, at equilibrium the product of the concentration on one side of the equation divided by the product of concentration on the other side is constant at constant temperatures, and therefore :

$$[Ca^{++}]^3 \times [PO_4^{\equiv}]^2 = K[Ca_3(PO_4)_2]$$

" Now tertiary calcium phosphate is a sparingly soluble salt, and in such—

$$[Ca^{++}]^3 \times [PO_4^{\equiv}]^2 = K.$$

This K is called the solubility product constant, and whenever the product of the concentration of calcium and phosphate ions becomes greater than the solubility product, solid calcium phosphate will be deposited.

" The problem is, however, not quite so simple as this, and at least one other factor must be taken into account—namely, the presence in the serum of carbon dioxide in considerable concentrations. This has an influence on tertiary calcium phosphate which may be expressed thus :—

$$Ca_3(PO_4)_2 + 2H_2CO_3 \rightleftarrows 2CaHPO_4 + Ca(HCO_3)_2 \rightleftarrows [Ca^{++}]^2 + [HPO_4^{=}]^2 + [Ca^{++}] + [HCO_3^{-}]^2$$

"If the carbon dioxide tension of this solution be reduced, the reaction will proceed to the left and calcium phosphate will be deposited if the solubility product is exceeded, as it will be, since the solution is saturated. Now when the plasma substances, dicalcium phosphate and calcium bicarbonate, arrive at the osteoid and diffuse into the interstitial spaces, the concentration of carbonic acid falls below the plasma level and therefore precipitation occurs.

"In rickets the bicarbonate factor is unaltered from the normal, but calcium and/or phosphorus may be. An index of the reduction in the plasma of the material required for calcification could be obtained if it were possible directly to measure calcium and phosphorus ions. Unfortunately, there is no generally accepted method of doing this, but Howland suggested that the product obtained by multiplying total calcium by total phosphorus would serve as an equally reliable index, and formulated the following rule:- The product of the concentration of phosphorus and calcium in the serum, expressed as milligrammes per cent, in the normal child is between 50 and 60; when the product is below 30 rickets is usually present. When it is above 40 either demonstrable healing is taking place or there has never been any rickets. With products between 30 and 40 rickets is usually present."

Vitamin D and Sunlight.—The now well-established 'antirachitic vitamin' apparently acts by facilitating the absorption of calcium and phosphorus from the intestine. This may be brought about by stimulating the breakdown of organic phosphates into more easily absorbable combinations, or, as Parsons thinks more probable, by altering the pH of the intestinal canal in the acid direction. Thus, an adequate supply of vitamin D, or its progenitor sunlight, is a necessary adjuvant to the calcium and phosphorus in the diet if rickets is to be prevented or cured. To quote L. Parsons again: "Adequate supplies of vitamin D or sunshine will prevent or cure rickets even when a baby is taking a diet which, from deficiency in calcium, phosphorus, or vitamin, would otherwise produce rickets.

"Of all the factors concerned in the prevention of rickets, exposure of the body to sunshine and the preservation of the natural habitat of the child and diet of the mother are probably the most important. As clothing increased, and with it the urbanization of society, the migration into cities and darkened dwellings, or, as in the case of the negro peoples, if movement occurred into more temperate zones, or, as in the case of the Labrador Eskimo, the maternal diet so changed that the supply of vitamin D diminished, rickets developed even in breast-fed children, but with more certainty in those artificially fed. Thus we have the appearance and development of rickets associated with the progress of civilization, and in particular with the rise of industrialism and the decline of breast-feeding."

The observation that the administration of vitamin D and of sunlight, real or artificial, can be alternative methods of treatment depends upon the theory that the mode of action of ultra-violet rays is by synthesis of vitamin D from sterols already present in the skin of the patient. For some time now it has been known that cholesterol can be activated by exposure to these rays, and that it then develops a powerful curative effect on rickets. It has been used with striking success in treatment; but some failures ensued, leading to the discovery that only the specimens containing ergosterol as an impurity developed antirachitic powers after irradiation. So potent, indeed, is irradiated ergosterol that some experimenters have been tempted to think it may itself be pure vitamin D. Parsons discusses these subjects, thus: "Evidence that irradiation does produce vitamin D *in situ* is found in the fact that rats fed on a dietary producing the low phosphorus type of rickets develop an alkalinity of the fæces, the pH of which can be reduced, even to the acid side of neutrality, by irradiation or by the administration of irradiated ergosterol or cod-liver oil. Further evidence that irradiation of the cholesterol (or ergosterol) of the skin has a curative action is found in the observation of Hume, Henderson-Smith, and Lucas that inunction of irradiated cholesterol into the skin of rabbits and rats fed on a rickets-producing dietary prevented the development of rickets.

" Whence comes the vitamin D present in cod-liver oil ? It has been stated that this is obtained from the green algæ and diatoms (plankton) in the upper waters of the ocean, and that in these vitamin D is synthesized under the influence of sunlight. This plankton constitutes the food of small fish, which in their turn form the diet of the cod, and in the latter the vitamin is largely housed in the liver. The most recent researches, however, show that, whilst the marine diatom is a rich source of vitamin A, it contains no vitamin D, and the suggestion has been made that, both in relation to green plankton and green vegetables, which contain much vitamin A but little or any D, the same mistake has been made as in the earlier work of Mellanby on fats when no differentiation was made between the A and D vitamins. Moreover, Bills has shown that the principal food of the Newfoundland cod is the caplin, but that this does not contain enough vitamin D to account for the amount of vitamin which is accumulated by the cod during its midsummer period of fattening, and he therefore suggests that the vitamin may be synthesized by the cod.

" The exposure of an animal to sunlight raises the content of vitamin D in its milk, and for this reason cow's milk shows a seasonal variation in vitamin-D content which is related to similar seasonal variations in the incidence of rickets. The content of vitamin D, however, is not greatly increased by sunlight, but can, on the other hand, be considerably augmented by exposing the animal to ultra-violet rays from artificial sources, although such milk will not compare in antirachitic power with milk irradiated directly. It seems evident, therefore, that during the winter months breast milk must be considerably poorer in vitamin D than in the summer. However, it has been proved, as in the case of cow's milk, that the antirachitic properties of human milk can be increased by the irradiation of the mother, and that if cod-liver oil be given to her, the vitamin D can pass into her milk. Although it is a matter of universal clinical observation that rickets is far less common in children who are breast-fed, the question of the antirachitic effect of human milk and its relationship to vitamin D is one of great interest and difficulty. This difficulty will become even greater if confirmation is obtained of some recent experiments of Hess, from which he concludes that human milk is exceedingly poor in the antirachitic substance, and that its high protective power in rickets cannot be ascribed to that factor. McCollum states that animal experiments make it clear that faulty nutrition of the mother during pregnancy and the early part of the nursing period may so debilitate her young that later a diet which should protect against rickets may fail to do so, and, according to Greenbaum, if the maternal diet during the last three months of pregnancy is made approximately correct in caloric and mineral intake, rickets will not be absolutely prevented, but the mother's diet will have a controlling influence in the development of the disease in the offspring.

" Rickets, however, does frequently occur in breast-fed premature children, twins, and particularly in dark-skinned Italian and negro children living in North American cities. Prolongation of breast-feeding into the second year of life is also very liable to produce rickets. The conditions under which Eskimo children live are of great interest in this connection. In Greenland rickets does not exist, despite the fact that children are nursed until the age of 2 to 4 years, whereas in Labrador, although the children are much more exposed to sunshine, rickets is almost universal. The Greenland Eskimo, contrary to popular belief, eats little fat, but partakes freely of uncooked fish, birds, seals, etc., and the freedom from rickets is probably due to the presence in this diet of considerable quantities of vitamin D derived from the fish on which the birds and seals feed. The Labrador Eskimo, on the other hand, cooks his food, a large proportion of which is prepared or tinned, and eats very little vegetables (Thomas)."

Ultra-violet Rays.—This is a subject that becomes of increasing interest year by year to students of rickets. According to H. J. Gerstenberger[2] this is the most important single factor in the prevention and cure of the disorder, such considerations as heredity, diet, lack of exercise and vitamins, being all secondary to the deficient exposure to sunlight in producing it. This writer affirms that rickets cannot be a dietetic disease, since it arises at an age when the child is entirely fed on milk, human or cow's, in which food neither calcium nor phosphorus is deficient in quantity nor are they improperly proportioned. He also observes that low-phosphorus rickets occurs most frequently and in its severest forms in artificially fed babies, although cow's milk has a much higher phosphorus value than human. He regards the antirachitic power of human milk as almost negligible, at least during the dark months of winter, and in a series of observations carried out by himself[3] was unable to demonstrate any healing in cases of active rickets fed from wet-nurses even when these latter were receiving cod-liver oil in addition to a normal liberal diet. He did, however, obtain evidence of healing in cases fed by wet-nurses who were regularly undergoing exposure to ultra-violet rays, though the healing in these cases was less rapid than in those where the rays were applied directly to the patients themselves. Gerstenberger emphasizes the fact that the undoubted deficiency diseases, such as scurvy and beri-beri, are infinitely rare in breast-fed infants, whereas rickets is comparatively common ; he regards rickets as essentially a climatic disorder.

Cœliac Rickets.—It has long been known that rickets does not make its appearance unless growth is also taking place. Thus ordinary diarrhœa, though an obvious cause of deficient fat-absorption, is not associated with rickets even if it is of more than short duration, because it produces a state of starvation during which growth cannot occur. In cœliac disease, again, during its earlier and severer stages rickets is seldom seen, though there is gross deficiency of fat-absorption and the bones may already show an osteoporosis which Parsons regards as pre-rachitic. In this acute stage of the disorder growth is often completely at a standstill, and it is possible that the small amount of vitamin D derived from the subnormal fat-absorption is yet able to mobilize enough calcium and phosphorus to ossify these light bones as long as little or no growth is taking place. Late rickets, however, is by no means uncommon in cœliac disease, appearing when improvement has taken place and growth started again as the result of correct dieting.

In earlier days the problem of preventing the onset of this late rickets was a difficult one. Increase of the fat in the diet beyond a certain point produces an increase in the size, number, and fat-content of the stools and thus a diminished fat-absorption ; the administration of cod-liver oil without any additional fat in the diet has a similar effect. The work of recent years, however, has shown that the necessary vitamin can be supplied either by exposing the child to the ultra-violet rays, or by administering irradiated ergosterol, either of which procedures results in the prevention or cure of rickets.

Renal Rickets.—In this condition the fault is a chemical one, and a defect not of ingestion but of excretion. As suggested above, excessive retention of phosphorus results in disturbance of the calcium–phosphorus balance, though the actual value of the blood-calcium may be up to the normal or even above it. Of renal rickets Parsons[1] writes : " It is possible to see rickets develop in a case of renal infantilism, heal, and then relapse. Thus there is produced a flux between healing and relapse, and this can be correlated with periods in which the blood-phosphorus waxes and wanes. If estimations of blood-urea or non-protein nitrogen are made, it is found that the curve of phosphorus retention parallels the curve of nitrogen retention. 'Renal' infants pass through many attacks of uræmia before the final one closes their chequered career. Such attacks, I believe, make their rickets worse by increasing the disparity between calcium and phosphorus, whereas in the periods of improvement the phosphorus may even return to normal limits, with the result that the calcium-phosphorus ratio becomes normal and the rickets heals. Contributory factors in this healing are a lessened degree of acidosis, and a lessened depressing effect of phosphorus on calcium and of the resulting need to call on the calcium reservoirs.

" I would also draw attention to the fact that anything which increases phosphorus absorption from the alimentary tract may make the condition worse. Definite evidence has, I think, been produced by Teall and myself showing that ultra-violet irradiation, far from ameliorating, actually increases the rachitic manifestations. Let me add in passing that in renal rickets we have another illustration of the effect of growth in the development of rickets, because in those rare cases which survive until the later 'teens, when the growth period has ceased and the epiphyses joined up, rickets does not occur, although the bone is still osteoporotic to some degree and the calcium-phosphorus ratio is abnormal."

REFERENCES.—[1]*Lancet*, 1928, ii, 434 and 486 ; [2]*Jour. Amer. Med. Assoc.* 1927, ii, 261 ; [3]*California and West. Med.* 1927, xxvii, 40.

RINGWORM. (*See* SKIN, FUNGOUS AFFECTIONS OF.)

RIVER POLLUTION.

Joseph Priestley, B.A., M.D., D.P.H.

It is the old story. Why will not the local authorities and others concerned carry out to the full their existing legal powers rather than agitate for further powers? That authorities are guilty of such a mistake is true, of course, not only of matters concerning river pollution, but of other equally important matters dealing with sanitary administration. With regard to river pollution, it is agreed that much of such pollution (which undoubtedly exists) is due to failure to administer the existing law. What is the reason? Want of expert knowledge and the necessary financial resources, together with the need of co-ordinating action throughout the various watersheds concerned. Special watershed Boards are useful in this respect, as has proved to be the case in rivers Boards. The watershed is undoubtedly the proper unit for administrative purposes, with the appointment, if and when required, of subsidiary bodies, from which only can be obtained the necessary local knowledge and help. Much has been done in the past, and much will require to be done in the future, in the way of persuasion rather than through legal machinery. Such appear to be the views up to date of the Joint Advisory Committee on River Pollution, appointed by the Ministry of Health and the Ministry of Agriculture and Fisheries conjointly.

The whole question of river pollution forms interesting reading to-day. Much has been accomplished since the passing into law of the Rivers Pollution Act, 1876, Section 4 of which made the pollution of a river a statutory offence. The first difficulty in administration began with the raising of the question as to 'prescriptive rights to pollute rivers'. There are, of course, no such rights allowed under the 1876 Act. If there was any doubt on the point, it was set at rest once and for all by Mr. Justice Eve in 1922 in the case of Hulley *v.*

Silversprings Bleaching and Dyeing Company, when it was definitely laid down that no one can acquire a prescriptive right to do what a statute forbids. Following this legal dictum, it remains with the various authorities and owners concerned to put their houses in order and to carry out the law in letter and in spirit, and see that it is so carried out. In the Hulley case the question as to 'prescriptive rights' was raised in defence most energetically—long-established usage from time immemorial, or under a presumed lost grant, or under 20 years' period of prescription. The Judge was adamant, however, and ruled that there was a statutory nuisance under Section 4 of the Rivers Pollution Act, 1876; and such decision remains the case law to-day, unless and until such decision is altered on appeal.

ROSACEA.

A. M. H. Gray, M.D., F.R.C.P., F.R.C.S.

Sibyl R. Eastwood[1] has reported investigations in forty-five cases of this condition. She finds that nearly half the cases show a low secretory curve of hydrochloric acid in the stomach—a result corresponding closely to that shown by W. H. Brown in 1925. She further shows that nearly three-quarters of the cases have a distinctly low blood-pressure. She considers the possibility of some vasodilator substance being responsible for the condition, and of this being produced by bacterial activity in the small intestine. The administration of **Hydrochloric Acid** was found to have a good effect in more cases than could be accounted for by the low curves. She found some digestive disturbance in 84 per cent of cases, and whatever its type, its effective relief was accompanied by relief of the rosacea. Carbohydrate excess in diet was a fairly constant finding; focal sepsis also appeared to be a factor in etiology, or in maintaining rosacea when developed.

C. H. Rulison[2] found that about two-thirds of fifty patients examined by him had subacidity and a somewhat similar proportion had low blood-pressure. He considers that the following conditions may be found associated with the disease: a neurotic tendency, subnormal weight, low blood-pressure, poor muscular tone, faulty posture, visceroptosis, chronic constipation, spasticity of the large bowel, and gastric subacidity. Correction of these conditions, together with local treatment, results in rapid and lasting improvement in most cases.

REFERENCE.—[1]*Brit. Jour. Dermatol. and Syph.* 1928, March and April, 91 and 148; [2]*Amer. Jour. Med. Sci.* 1927, July, 60.

RUBELLA.

J. D. Rolleston, M.D.

SYMPTOMS AND COMPLICATIONS.—F. Weiss[1] illustrates the slight degree of infectivity of rubella by the fact that during a recent epidemic at Prague, out of 10 children who were exposed to infection from one and a half to two hours 9 escaped, the incubation period in the case of the child who contracted the disease being eighteen days.

Carrieu, Lamy, and Bouchet[2] report an epidemic of 96 cases of rubella which occurred in the Montpellier district. Two-thirds of the cases were very mild, but in some of the remainder the temperature rose to 103°, 104°, or higher, and two children, 4½ and 5½ years of age, died on the third day of disease before the eruption had appeared, death being preceded by convulsions. In two cases the glandular enlargement pursued an abnormal course, suppuration occurring in one patient who recovered, while the other child, in whom operation was refused, succumbed. [Although cases of non-eruptive rubella have been described (*see* MEDICAL ANNUAL, 1924, p. 403), their occurrence is so rare that the diagnosis of rubella in the first two fatal cases hardly seems justified.—J. D. R.]

REFERENCES.—[1]*Med. Klinik,* 1928, 1120; [2]*Presse méd.* 1928, 274.

SACRO-ILIAC STRAIN. (*See* SPINE, AFFECTIONS OF.)

SALIVARY GLANDS, MIXED TUMOURS OF. (*See* MOLAR AND SALIVARY GLANDS.)

SARCOMA. (*See* CANCER.)

SCARLET FEVER.

J. D. Rolleston, M.D.

EPIDEMIOLOGY.—According to reports received from 37 states,[1] scarlet fever was more prevalent in the United States in 1927 than during any of the preceding years, there being 158,978 cases in 1927 as compared with 143,159 in 1926 and 135,937 in 1925.

F. von Bormann[2] states that during the epidemic of scarlet fever at Reval in 1926–7 there were numerous cases of tonsillitis without any other symptoms of scarlet fever, especially in communities such as asylums and barracks. In a summer colony for children, in addition to 12 cases of typical scarlet fever there were 48 cases of tonsillitis. Von Bormann is of opinion that the exanthem is only a facultative symptom of scarlet fever, and that cases of tonsillitis during scarlet fever epidemics are really masked forms of the disease.

ETIOLOGY.—The persistence of hæmolytic streptococci in the throat after an attack of scarlet fever and their relation to the spread of the disease, to which reference was made in the last issue (*see* MEDICAL ANNUAL, 1928, p. 411), is illustrated by M. B. Kirkbride and M. W. Wheeler,[3] who record two cases in which hæmolytic streptococci producing toxin neutralized by standard scarlet fever antistreptococcus goat serum were isolated from patients for thirty days to six months after the onset of typical scarlet fever. There was definite evidence in these two cases that other persons developed scarlet fever from contact with them.

B. Fejgin[4] isolated hæmolytic streptococci either in pure culture or in association with saprophytic organisms, notably *Staphylococcus albus*, from the pages of books used by children suffering from scarlet fever, especially the corners of pages which were most likely to be contaminated by the patients' saliva. The following control tests were carried out : (1) Six books of healthy children who had never had scarlet fever were examined, and in none could scarlatinal streptococci be found. (2) A new book was contaminated with a broth culture of a scarlatinal streptococcus. Subsequent cultures of the book taken at different intervals remained positive for four to six weeks. Books therefore which have been handled by scarlet fever patients may harbour the causal organism and be responsible for a spread of the disease. Such books, therefore, should not be handled for at least six weeks, and even after that period it is best to disinfect them.

BLOOD.—J. Sabrazès[5] states that leucocytosis is the rule in scarlet fever, especially in malignant forms. Even in moderate attacks the total number of white cells not infrequently exceeds 15,000 to 20,000. The leucocytosis is chiefly manifested by an increase in the neutrophil polymorphonuclear cells. As the temperature falls the number of leucocytes diminishes, but does not become normal until desquamation is finished. Not infrequently a few neutrophil myelocytes appear in defervescence. The polymorphonuclears often show toxic changes in their nuclei and cytoplasm. In scarlet fever it is frequent to find the basophil inclusive bodies first described by Bavranikow in 1910 and later by Döhle and many others, including Granger and Pole under the reviewer's supervision (*see* MEDICAL ANNUAL, 1914, p. 500). During the first few days the eosinophils are normal, but subsequently they show a considerable increase in proportion to the rise in the leucocytosis. In fatal cases, however, eosinophils may be entirely absent. As regards the red cells, anæmia is not exceptional, and occasionally nucleated red cells are found. The sedimentation rate is increased during the first few days of the disease, and then gradually becomes normal by the end of the fourth week. The surface tension of the plasma falls more or less during the first week, particularly on the occurrence of complications and even before they develop. J. A. Toomey and J. A. Gammel[6] identify the bodies described by Amato in 1913 with Döhle's inclusion bodies. On examination of 100 cases, consisting of 50 scarlet fever patients and 50 controls, they found that the bodies were not always present in scarlet fever but occurred in other diseases, although they were present more frequently in scarlet fever than in any other acute infection.

SYMPTOMS AND COMPLICATIONS.—Most authorities, including the reviewer, are agreed that scarlet fever is rare during the first year of life (*vide infra*, 'Dick Test'), and are in favour of lactation being continued when the mother contracts the disease on the grounds that infants in the first months of life are either entirely immune to scarlet fever or have only an abortive attack. Oles,[7] however, reports the case of a three-weeks-old infant who developed typical scarlet fever five days after the mother, who had a severe attack. Not only were the eruption and throat symptoms characteristic, but the Schultz-Charlton reaction was positive and typical desquamation followed. I. Berger[8] remarks that in contrast with ulcero-necrotic angina *ulcero-necrotic glossitis* is a rare complication of scarlet fever. He records a case in a girl, age 11½ years, who in the course of a severe attack of scarlatina anginosa developed ulcers first on the sides and then on the back of the tongue and both lips. No diphtheria bacilli were found, and no benefit was derived from intramuscular injection of diphtheria antitoxin. Gradual improvement took place, and finally complete recovery occurred.

J. D. Rolleston,[9] who reports an example of *post-scarlatinal hemiplegia*, states that in 1908 he collected 66 cases of this rare complication, including 3 which he had observed himself. Since then he has found only 9 cases on record. The present case, therefore, was only the fourth he had seen in twenty-seven years' experience of acute infectious diseases. The ages of the 76 patients ranged from 0 to 27. Though 54 had survived, in only 17 was recovery complete. In most of the survivors contractures had supervened. The alleged causes of the hemiplegia in order of frequency were uræmia, cerebral embolism, thrombosis, hæmorrhage, and encephalitis, but in only 9 had an autopsy been held. Rolleston's case was a boy, age 3½, who developed right hemiplegia and aphasia on the thirty-third day of a severe attack of scarlet fever. He presented well-marked right ankle-clonus and bilateral Babinski's sign; the abdominal reflexes were absent. For about a fortnight before the onset of the hemiplegia there had been signs of grave cardiac mischief (dilatation, embryocardia, and gallop rhythm). There was no evidence of nephritis. The child gradually recovered power in the right arm and leg and entirely regained his power of speech. There did not appear to be any mental defect, but there was a slight degree of contracture of the right wrist and fingers.

In view of the fact that the *Wassermann reaction* has sometimes been stated to be positive in scarlet fever in the absence of syphilis, the observations of Rosier[10] and Bethoux[11] are of interest. Rosier performed the Wassermann reaction in 31 scarlet fever patients, 26 of whom were children and 5 adults, using each of the three techniques of Wassermann, Hecht, and Desmoulières. None gave a positive or even a doubtful reaction. Bethoux also found an invariably negative reaction in 27 cases of scarlet fever of moderate intensity without clinical evidence of hepatic or renal disease. Both writers are agreed that a positive Wassermann reaction in scarlet fever in the absence of active syphilis must be attributed to the nature of the antigen employed, and especially to its acetone soluble lipoid content.

Dick Test.—A. Lichtenstein[12] carried out the Dick test on 100 recently delivered women and their children with the following results: (1) Of the women, 27 were positive and 73 negative. (2) Of the newborn, only 7 were positive, while 93 were negative. (3) The children of Dick-negative mothers always gave a negative reaction, but of 27 Dick-positive mothers only 7 had Dick-positive children, the remaining children being Dick-negative.

N. Malmberg and G. Jacobsohn[13] examined the Dick reaction in 1200 children up to the age of 15, and found that it was positive in 66·8 per cent, negative in 24·2 per cent, and doubtful in 9 per cent. In those with a previous history of scarlet fever the reaction was positive in 11 per cent. Pseudo-reactions were more frequently found in children with increased sensitiveness to tuberculin than in others. Investigations of the spontaneous variability of the reaction showed that a positive reaction underwent practically no changes in re-testing, whereas a negative reaction changed into a positive one in 20 per cent. A positive reaction, therefore, might be regarded as trustworthy, while a negative one should be accepted less readily and be followed by another test.

R. Debré, M. Lamy, and H. Bonnet,[14] unlike some observers who consider that the site is of great importance in determining the strength of the reaction, found that while the front of the forearm was the most convenient site, any other area of the skin could be employed. As regards the effect of various serums on the reaction they found that while injection of normal horse serum, diphtheria antitoxin, and antitetanic serum had no effect, convalescent measles serum soon caused the reaction to become negative. In cachectic states, especially those due to tuberculosis in which the Pirquet reaction was negative, the Dick reaction was also negative. A prolonged stay in hospital had the effect of converting a positive into a negative reaction without the subject having had an attack of scarlet fever or an injection of serum or treatment of any kind. This change is probably due to the process of occult spontaneous immunization such as occurs in some cases of immunity to diphtheria (*see* MEDICAL ANNUAL, 1926, p. 127). The only infectious disease which appeared to have any obliterating effect upon the reaction was measles, which in most cases converted a previously positive reaction into a negative one. Various skin eruptions, such as those due to drugs, toxic products, or ultra-violet rays, had the effect of making the reaction completely or partially negative. On the other hand, the eruption of scarlet fever or measles often caused reappearance of a Dick reaction which had been performed several days or even weeks previously.

PROPHYLAXIS.—Inoculation of scarlatinal toxin by the *nasal route*, as has been done with diphtheria anatoxin in the prophylaxis of diphtheria (*see* MEDICAL ANNUAL, 1928, p. 116) was carried out by G. Ramon and C. Zoeller[15] in 20 cases. Two series of inoculations of Dick toxin were given, with or without an interval of ten days between each series, 0·5 c.c. of pure Dick toxin being instilled into each nostril. Of the 20, 18 presented a negative Dick reaction eight days after the second series, and streptococcus antitoxin was found in their serum. The other two remained positive after a third series of nasal instillations. The method in every case was well borne by the nasal mucosa.

H. Sparrow[16] states that among 21,955 persons in Poland of ages from 1 to 18 years who were actively immunized against scarlet fever between January 1, 1925, and March 1, 1927, only 94, or 0·43 per cent, contracted the disease, the attack being abortive in 44 cases, ordinary in 34, complicated in 12, and fatal in 4, whereas the incidence of scarlet fever among 89,818 non-immunized persons was 1558 cases, or 1·26 per cent.

Treatment.—U. Friedemann and H. Deicher[17] record observations on 455 cases of scarlet fever treated with **Antitoxin** at the Rudolf Virchow Hospital, Berlin, between June 1, 1925, and March 1, 1928. The most striking effect was that produced on the temperature, which fell by crisis in 34·4 per cent and in another 15·1 per cent reached normal in forty-eight hours. A simultaneous improvement in the general condition also took place. The effect of the serum was all the more marked the earlier it was given. The serum also had a remarkable effect upon the rash. Among 276 cases in which this point was noted, the rash faded in twenty-four hours in 58·8 per cent, in forty-eight hours in 31·9 per cent, and in three days in 6·8 per cent, while in 2·5 per cent it lasted longer. As regards the action of serum on complications, it appeared to be only of value in the prevention of suppuration in the early stage. No difference was noted as regards the incidence of late adenitis and nephritis in the treated and untreated cases. As regards indications for serum treatment, whereas at first the writers reserved it for the severe cases, they now use it for any well-marked cases owing to the possibility of an initially mild attack subsequently becoming severe.

References.—[1]*Public Health Rep.* 1928, xliii, 111 ; [2]*Klin. Woch.* 1927, 1852 ; [3]*Jour. Amer. Med. Assoc.* 1927, lxxxix, 1394 ; [4]*Comptes rend. Soc. de Biol.* 1928, xcviii, 118 ; [5]*Arch. des Mal. du Cœur, etc.* 1928, 193 ; [6]*Amer. Jour. Dis. Child.* 1927, xxxiv, 841 ; [7]*Med. Welt,* 1928, 408 ; [8]*Monats. f. Kinderh.* 1928, xxxviii, 289 ; [9]*Proc. Roy. Soc. Med.* (Child Sect.), 1928, xxi, 1 ; [10]*Thèse de Paris,* 1927, No. 226 ; [11]*Jour. de Physiol. et de Pathol.* 1927, 534 ; [12]*Acta Pediatr.* 1928, Suppl. ii, 121 ; [13]*Ibid.* 119 ; [14]*Ann. de Méd.* 1928, xxiii, 22 ; [15]*Comptes rend. Soc. de Biol.* 1927, xcvii, 701 ; [16]*Presse méd.* 1928, 549 ; [17]*Deut. med. Woch.* 1928, 813.

SCHISTOSOMIASIS.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

An intradermal reaction in schistosomiasis is described by N. H. Fairley,[1] in which an extract of the dried livers of cercarial infected planorbis snails is used. It produces the rapid appearance of a large white wheal two or three centimetres in diameter, with surrounding erythema, and also a delayed erythema with swelling of the skin three to twenty-four hours after the injection ; 7 out of 8 bilharzial cases gave the reaction, but of 44 controls only 3 gave immediate, and not one the delayed, reaction. They are also given by cured cases. J. Bequaert[2] has published a highly technical account of the molluscs of importance in human and veterinary medicine. H. T. Kirkland[3] records the case of a soldier infected in South Africa in 1902 and suffering from an exacerbation of the disease in 1921. F. G. Cawston[4] reports a decrease of bilharzial disease in Natal, and attributes it to keeping of ducks, which eat the carrier snails, and to the increase of sugar-growing. The same writer[5] urges more efficient prophylaxis and complete cure of cases.

M. Khalil[6] reports the successful eradication of bilharziasis in a village in Egypt with infection of 63·5 per cent of the people with *S. hæmatobium,* by means of the continued addition for four days and nights of **Copper Sulphate** to the stream containing the carrier snails, so as to produce a dilution of five parts to a million of water. After six months no living bullinus snails could be found, and no deleterious effects on man or beast had resulted. P. T. Wallis[7] reports good results in the treatment of schistosomiasis with ½ to 1½-gr. doses of **Sodium Thioglycolate** and with **Antimony Thioglycollamide** intravenously, and found them to be less toxic than tartar emetic. The former keeps for some months in powder form in capsules, and the last-named preparation also keeps in solution in ampoules.

References.—[1]*Med. Jour. of Australia,* 1927, Dec. 10, 811 ; [2]*Amer. Jour. Trop. Med.* 1928, March, 183, and May, 215 ; [3]*Jour. Trop. Med. and Hyg.* 1928, April 2, 78 ; [4]*Ibid.* May 15, 117 ; [5]*Trans. Roy. Soc. Trop. Med. and Hyg.* 1928, March 31, 473 ; [6]*Lancet,* 1927, ii, 1235 ; [7]*Jour. Roy. Soc. Trop. Med. and Hyg.* 1928, May 15, 115.

SCHOOL OFFICIAL CLOSURE FOR INFECTIOUS DISEASE.

Joseph Priestley, B.A., M.D., D.P.H.

From time to time the question and advisability or otherwise of school closure for infectious disease outbreaks arises, and it may be useful to put on record again the official view of the Board of Education, to the effect that it is only in special and quite exceptional circumstances that school closure is necessary in the interests of public health in connection with infectious disease outbreaks, assuming that the powers to exclude individual children from school are used to the best advantage. The Board of Education (and the Ministry of Health agrees) goes further, and has given notice accordingly, to the effect that closure of schools for medical reasons (infectious disease) will not be officially accepted unless such closures are in strict accordance with the principles laid down in the revised 1926 Code of Regulations for Public Elementary Schools, and Administrative Memorandum No. 51 (January, 1927). In this way there is no longer a temptation to close schools on financial grounds, i.e., to prevent loss of grant owing to lowered attendances, in connection with infectious disease outbreaks. This is an important pronouncement. The original Memorandum on School Closure was published by the Board of Education in 1909, and was revised by that Board and the Ministry of Health in 1925.

SCIATIC PARALYSIS, OBSTETRIC. (*See* LABOUR AND ITS COMPLICATIONS.)

SEBORRHŒIC DERMATITIS. (*See* DERMATITIS SEBORRHŒICA.)

SEMINAL VESICLES. (*See* TESTICLES AND SEMINAL VESICLES.)

SERUM DISEASE. (*See also* DIPHTHERIA.)

J. D. Rolleston, M.D.

SYMPTOMS AND COMPLICATIONS. F. Bezançon and M. P. Weil[1] remark that the *joint manifestations* of serum disease are analogous to the arthropathies following spontaneous absorption of an albuminous fluid such as a pleural effusion or cardiorenal œdema, and suggest that many other arthropathies, including those of gout and some forms of so-called toxic rheumatism, are due to absorption of foreign protein. As a rule serum arthropathies disappear in three or four days without leaving any trace. Recurrence, however, is frequent, being observed, according to Weissenbach and Gilbert-Dreyfus, in 38·5 per cent of the cases. The condition is specially frequent in subjects of asthma, tuberculosis, and gout.

G. Katz[2] reports a case in a man, age 39, of *peripheral neuritis* following injection of 5 c.c. of tetanus antitoxin for a wound of the finger. The patient had had an injection of tetanus antitoxin the previous year for another slight wound. The following nerves of the right shoulder were principally affected: circumflex, long thoracic, suprascapular, and subscapular. Like the majority of cases, most of which have been reported by French writers (*see* MEDICAL ANNUAL, 1928, p, 425), the symptoms developed at the same time as the other manifestations of serum sickness. Katz rightly maintains that in view of tne rarity of its occurrence the possibility of neuritis should form no contra-indication to the use of tetanus antitoxin. Care, however, should be taken not to use too recently prepared serum, as this is particularly liable to give rise to serum sickness.

H. Verger, E. Aubertin, and P. Delmas-Marsalet,[3] who record two cases of *amyotrophic paralysis* following injection of antitetanic serum in men of ages 20 and 25 respectively, maintain that the paralytic symptoms are much more likely to be due to poliomyelitis than to radiculitis or polyneuritis, as spontaneous pain, tenderness on pressure of the muscles, and the liability for certain muscles to be affected are all found in Heine-Medin's disease. In view of the fact that antitetanic serum gives rise to amyotrophic paralysis much more frequently than other serums, the symptoms cannot be attributed to the horse serum alone, and must be mainly due to the toxicity of antitetanic serum.

TREATMENT.—J. Morgenstern[4] treated thirty cases of serum sickness following injection of antistreptococcal serum in a lying-in hospital by injection of the **Patient's Own Serum.** Five to ten c.c. of blood were taken from the vein at the elbow and immediately injected into the gluteal muscles. In most cases a single injection was sufficient to produce a fall of temperature and disappearance of the urticarial rash. It was only the cases in which the serum was not given until the second or third day of serum sickness and calcium chloride had already been administered that did not respond readily to the treatment. In such cases a second injection of 10 or 20 c.c. was given with good results.

REFERENCES. [1]*Monde méd.* 1927, 809, [2]*Munch. med. Woch.* 1927, 1637; [3]*Rev. de Méd.* 1927, xliv, 451; [4]*Wien. klin. Woch.* 1928, 89.

SHOCK. (*See* PRE- AND POST-OPERATIVE TREATMENT.)

SHOULDER, DROPPED. (*See* PLASTIC SURGERY.)

SKIN, AFFECTIONS OF. (*See also* ACNE VULGARIS; CREEPING ERUPTION DERMATITIS; DERMATOSIS, SCHAMBERG'S PROGRESSIVE; ECZEMA; ERYSIPELAS; ERYTHEMA MULTIFORME; LUPUS VULGARIS; NÆVI; PEMPHIGUS; ROSACEA; URTICARIA; VARICOSE ULCERS.)

SKIN, FUNGOUS INFECTIONS OF.

A. M. H. Gray, M.D., F.R.C.P., F.R.C.S.

Ringworm.—P. Ravaut, Basch, and Rabeau[1] report an epidemic ringworm in which the lesions were limited to the exposed parts of the neck, upper chest, and arms. The persons affected were all women employed in one of the Government offices in France. The fungus isolated was the *Trichophyton niveum radians* (Sabouraud), and it was obtained in 99 cases out of the 104 observed. Of these 99 cases, 57 showed typical circinate lesions, some with concentric circles. The remaining 42 cases showed various types of lesion resembling psoriasis, pityriasis simplex, pityriasis rosea, parakeratosis, eczematides, lichen planus, and dry isolated or agminated folliculitis.

Kerion.—P. Ravaut, Duval, and Rabeau[2] have had considerable success in treating suppurating ringworms of the beard by **Lugol's Solution.** This can be given by the mouth, but much better results are obtained by intravenous injection. The solution used consists of: iodine, 1 grm.; potassium iodide, 2 grm.; distilled water, 100 grm. For intravenous injection this is diluted with four times its volume of distilled water or normal saline. Doses equivalent to 5 to 10 c.c. of the original solution are given every day or every second or third day. A small dose should be given at first to test the patient's reaction. Usually eight to ten injections are given. There is some tendency for the solution to cause obliteration of the veins. The authors claim rapid cures in their cases, sixteen of which they publish, the average being about seventeen days. In all cases the fungus was demonstrated and cultured.

THALLIUM TREATMENT.—Further papers have been published giving results of treatment of ringworm by **Thallium Acetate.** J. Devane[3] reports satisfactory results in forty-five cases. He employs a dose of 8 mgrm. per kilo. of body weight, and has seen no toxic symptoms. He lays stress on three precautionary measures, which should always be observed: (1) That the body weight, nude should be accurately obtained. (2) That a standard reliable preparation should be used: he recommends Kahlbaum's "Thallium Depilatorium" as advised by Buschke; this is put up in tablets of three denominations, 100 mgrm., 10 mgrm., and 1 mgrm., by combining which the requisite dose can easily be obtained. (3) That the kidneys are functioning normally. As regards accessory treatment of the scalp, he mentions three methods, the zinc-lime cap, 10 per cent iodine tincture, and 10 per cent sulphur ointment, but does not state which he has found most satisfactory.

A. Season and C. R. Wilson[4] claim a 90 per cent standard of efficiency, provided a satisfactory preparation is used. They first treated thirty cases, all of which were complete failures, which they attribute to a stale and inactive preparation. Since then fifty cases have been treated with only three failures. They observed toxic symptoms in five cases; in two (aged 3 and 6 years respectively) a transitory albuminuria occurred: in three (two aged 11 years and one 10 years) pains in the knee-joints and tibiæ were present, one with effusion into one knee-joint. All three cleared up in less than a week under salicylates. They recommend, as an adjunct to thallium, epilation of the longer hairs with forceps, and after these have been removed the scalp is strapped with rubber plaster, which is allowed to remain in position for several hours and then stripped off, bringing away the remaining stumps.

J. Mouzon[5] gives a very complete summary of our knowledge of the therapeutics of thallium. He lays stress on the dangers of giving thallium to adults, as genital development provokes an endocrine or neuro-vegetative transformation, which increases the sensibility of the organism to the toxic action of thallium. All writers agree that thallium is slowly excreted and that it is not safe to repeat the dose in less than three months.

M. Drummond[6] has treated fifteen cases cases with one failure, while E. T. Freeman[7] has treated twenty-eight cases of ringworm, two of favus, and one of intractable folliculitis, with cures in all cases except one of favus.

J. E. M. Wigley,[8] in a series of fifty cases treated, is more doubtful about the advantages of this method. Using 8·5 mgrm. per kilo. of body weight, he finds the average time for complete depilation is twenty-four to twenty-six days, and that it is only entirely spontaneous in about half the cases. He lays considerable stress on checking his results by the fluorescence test (illuminating the scalp with ultra-violet rays passed through Wood's glass), which was referred to in last year's MEDICAL ANNUAL (p. 429), and claims that many cases passed as cured by ordinary clinical tests continue to show fluorescent hairs. In passing, he notices that some endothrix ringworm cases fail to fluoresce at all, probably owing to the cuticle of the hair remaining intact. Another point he stresses is that the more rapid regrowth of hair which occurs after thallium epilation, as compared with X-ray epilation, allows reinfection to occur more readily.

Epidermophytosis.—A number of papers have appeared on this subject during the year, though on the clinical side they add little to C. J. White's masterly survey summarized in last year's MEDICAL ANNUAL (p. 430). It is now recognized that this condition may be caused by a variety of fungi, and not only by the epidermophyton group. F. D. Weidman[9] finds the *Epidermophyton cruris* in only 54 out of 272 cases, the *Trichophyton interdigitale* being responsible for 140 cases. C. L. Karrenberg,[10] however, considers that this latter organism should be classified as an epidermophyton. Among the other fungi found by Weidman may be mentioned the *Trichophyton rubrum* and the *T. gypseum*, which were found in seventeen cases. *Oidium albicans* was found eight times and the *Sporotricheum schenckii* in one case. The subject of mycology becomes more and more complicated as time goes on, as those who have read the exhaustive papers by A. Castellani[11] can testify.

J. H. Mitchell[12] pleads for further research in the treatment of this condition, He calls attention to a preparation of **Cinnamon Oil and Thymol in Alcohol** advised by Myers and Thienes,[13] which has proved valuable in his hands, and also to the experiments of Lortat-Jacob and Bridault[14] on **Chinosol**. Epidermophytic lesions yielded readily to the following formula:—

℞	Chinosol	5 to 1 parts	Glycerin	20 parts
	Alcohol (90 per cent)	50 ,,	Water	150 ,,

(The drug is first dissolved in the water and the alcohol and glycerin added.)

J. M. H. MacLeod,[15] for the interdigital variety of epidermophytosis, recommends soaking the feet daily in salt water to macerate the thickened skin and allow remedies to penetrate. Remedies advised are Whitfield's 3 per cent **Salicylic Acid** and 5 per cent **Benzoic Acid Ointment**, a saturated solution of salicylic acid in spirit, the continuous application between the toes of 4 per cent salicylic acid plaster, or daily painting with a 3 per cent **Silver Nitrate Solution.** H. H. Sheoch[16] disagrees with MacLeod as regards salt-water bathing, as he considers it is impossible to dry the toes completely afterwards, and moisture is one of the factors which promotes the development of the fungus. He recommends 2 to 3 per cent **Chrysarobin Ointment**, applied sparingly but often, after careful washing and drying of the toes. It is essential to excise the top from all vesicles, remove all loose epidermis, and clean up the edges of ulcers. R. Hallam[17] recommends, after careful washing, either Whitfield's ointment or 5 per cent chrysarobin ointment. Both he and MacLeod lay stress on the sterilization of the socks and cleansing of the interior of the boots. For the vesicular type he recommends removing daily all dead overhanging epidermis and applying three or four times a day a wet dressing of 1 per cent solution of silver nitrate. As soon as the disease is under control—namely, the œdema has disappeared and the fissures have healed—a **Fractional X-ray Exposure** will hasten recovery. The hand should be covered with boiled cotton gloves or sterile gauze.

Cleveland White[18] has had a series of eighteen patients having a resistant epidermophytosis of the extremities in whom examination of the peripheral blood-vessels revealed an obliterating occlusive endarteritis, not thrombo-angiitis obliterans. He thinks that this circulatory impairment was a factor in favour of the development of the mycotic dermatitis. **Sodium Citrate** injections (20 per cent), in doses of from 5 c.c. up to 20 c.c., were given with beneficial results, care being taken to keep the dosage below the point of any systemic reaction.

REFERENCES.—[1]*Presse méd.* 1928, May 16, 609; [2]*Ibid.* 1927, Sept. 28, 1178; [3]*Med. Press*, 1927, Aug. 3, 95; [4]*Brit. Med. Jour.* 1927, ii, 263; [5]*Presse méd.* 1928, April 18, 484; [6]*Irish Jour. Med. Sci.* 1927, July, 314; [7]*Ibid.* 318; [8]*Brit. Med. Jour.* 1928, ii, 934; [9]*Jour. Amer. Med. Assoc.* 1928, i, 499; [10]*Arch. of Dermatol. and Syph.* 1928, April, 519; [11]*Ibid.* 1927, Oct., Nov., Dec., and 1928, Jan., 383, 571, 714, and 61; [12]*Jour. Amer. Med. Assoc.* 1927, ii, 421; [13]*Ibid.* 1925, June, 1985; [14]*Bull. Soc. d. Derm. et d. Syph.* 1926, Dec., 719; [15]*Brit. Med. Jour.* 1928, i, 656; [16]*Ibid.* 895; [17]*Ibid.* 835; [18]*Jour. Amer. Med. Assoc.* 1928, i, 1865.

SKIN, STAPHYLOCOCCAL INFECTIONS OF. (*See also* STAPHYLOCOCCAL INFECTION.)

A. M. H. Gray, M.D., F.R.C.P., F.R.C.S.

Boils and Carbuncles.—The method of election in treating boils and carbuncles still exercises the minds of many workers. L. Carp[1] has tabulated the results of treatment of 123 non-diabetic and 30 diabetic cases treated by different methods: (1) **X-ray + Accessory Therapy**; (2) **Surgery + Accessory Therapy**; (3) **Conservative Treatment**; (4) **Blood Circuminjection.** The author points out that it is really impossible to compare the results, as so many different factors enter into the problem and influence the decision as to treatment. For instance, the bulk of the cases treated by conservative methods were the milder ones. The results he obtained, however, in non-diabetic cases showed 54 per cent successful treatment in Group 1, 96 per cent in Group 2, 100 per cent in Group 3, and 93 per cent in Group 4. He concludes that each case is a problem in itself, and surgical judgement should be a guide in therapeutic preference. In large carbuncles the treatment of choice is radical surgery ; in small superficial carbuncles and in some large carbuncles, including those of the face, X-ray therapy as an aid to conservative therapy has given good results ; if, however, improvement does not occur in three or four days, other measures (surgery, circuminjection of autogenous blood) are indicated. In diabetic carbuncles prompt establishment of free drainage is essential to prevent spread of infection. X-ray therapy without surgery is contra-indicated. Circuminjection of autogenous blood may be used in selected cases, and it is a valuable adjunct in accessible spreading infections treated by other methods. There is no proof in the cases analysed by him that X-ray therapy alone effected a cure.

With regard to the circuminjection of autogenous blood, Carp in a previous paper[2] has described the treatment of twelve cases of carbuncle in non-diabetic subjects by this means. The method was first introduced by Loewen in 1923, and as used by him consisted of a number of injections of the patient's own blood into the margins of the carbuncle, associated with crucial incisions into the carbuncle. Carp has had success with this method without resorting to incision. He makes three to six intra- and subcutaneous injections round the carbuncle, the amount used varying from 10 to 70 c.c. He found that this procedure prevented the spread of infection (except in one case), and that there was rapid relief of pain and constitutional symptoms ; that most of the slough liquefied, and that the time of cure was probably shorter than if surgical methods had been adopted - the average time for cure being twenty-three days.

F. Christopher[3] gives an admirable survey of the methods which have been adopted in the treatment of furuncles and carbuncles. His conclusions are mainly those of Carp, that each case must be judged on its merits. In reference to the circuminjection of blood, he notes that Hilgenberg and Thomann[4] throw doubt on the necessity of using blood for circuminjection, as in rats and mice effectual blocking of strychnine could be obtained by making an encircling wall of such substances as blood, human blood serum, acacia solution, Ringer's solution, distilled water, diphtheria antitoxin, or a silver salt.

F. Kroh[5] describes the employment of **CO_2 Snow** in the treatment of acute inflammatory processes of the skin. The stick of CO_2 snow must be larger than the lesion to which it is applied, and it must be modelled to suit so as to produce even contact with the lesion. The skin is shaved and the fat removed with ether before the application. After freezing, boric acid ointment dressing is applied, and in the case of furuncles of the face or carbuncle the patient is kept in bed and is not allowed to talk. As the application is painful, 0·5 grm. **Veramon** is given half an hour before the freezing. One or two tablets of veramon may be given afterwards if necessary, and hot baths or fomentations may also give relief. An abscess forms in twenty-four to forty-eight hours, rarely later. This is either allowed to burst spontaneously or opened, the necrotic tissue allowed to escape, and a suction glass applied daily. The duration of the application of the snow is important, and the author lays down the following times : For pea-sized furuncles, 20 to 25 sec. ; for half-a-cherry-sized furuncles, 30 to 40 sec. ; for cherry-sized furuncles, 40 to 60 sec. ; for walnut-sized furuncles, 60 to 80 sec. ; for apricot-sized furuncles, 80 to 120 sec. ; for large-sized carbuncles, 180 sec. Special times are also recommended for special sites on the body.

Acrodermatitis Continua. H. W. Barber and J. W. H. Eyre[6] have contributed an important article on this subject. The condition, described by Hallopeau in 1890, is characterized by recurrent pustular dermatitis of the hands, sometimes also the feet, usually with involvement of the nails, and arising in the first instance from an injury. In a few cases involvement of other parts of the skin surface of a similar type has been recorded, and even involvement of the mucous membranes. The authors consider the condition to be identical with the affection originally described by Radcliffe Crocker in 1888 under the name of 'dermatitis repens'. In Crocker's cases the eruption consisted of vesicles and bullæ, starting at the site of an injury and spreading by direct continuity, leaving a denuded area bounded by a collar of elevated epidermis. He stated that although new adjacent foci might be formed, the disease did not generalize by the formation of new distant foci. A dry form of the affection was also described by Crocker. Barber and Eyre describe in detail three cases which they have examined both histologically and bacteriologically, and they have come to the conclusion, both on clinical and histological grounds, that the two conditions are identical. They were unable to find any evidence that a neuritis was a primary factor in the etiology of the eruption — a view formerly held by Crocker—but believe that it is due to an invasion of the skin, and often the mucous membranes, by a strain of *Staphylococcus pyogenes aureus* possessing distinctive pathological activities. Its characteristics may be inherent in the particular strain, but are more probably acquired, and dependent on a favourable environment provided by the host's tissues. They think it is likely that gross sepsis elsewhere may be the most important factor responsible for the peculiar virulence of the staphylococcus in question.

REFERENCES. [1]*Ann. of Surg.* 1927, Nov., 702; [2]*Arch. of Surg.* 1927, April, 868; [3]*Surg. Gynecol. and Obst.* 1928, May, 345; [4]*Deut. Zeit. f. Chir.* 1923, 267; [5]*Zentralb. f. Chir.* 1928, April 14, 919; [6]*Brit. Jour. Dermatol. and Syph.* 1927, Dec., 485.

SKIN STERILIZATION. (*See* PRE- AND POST-OPERATIVE TREATMENT.)

SKIN, STREPTOCOCCAL INFECTIONS OF.

A. M. H. Gray, M.D., F.R.C.P., F.R.C.S.

Streptococcal Pityriasis.—Most people are familiar with those dry scaly patches, often of skin colour but sometimes of a pronounced pinkish tinge, which are seen commonly on children's faces. It has been known for a long time that some of these at any rate were of an infectious nature and were due to a streptococcal infection. Transition stages between these lesions and true impetigo contagiosa have frequently been observed. H. Haxthausen[1] has made an exhaustive cultural study of these eruptions, using crystal violet in association with various nutritive media. This dye in weak concentration prevents the growth of staphylococci but does not inhibit that of streptococci. Further, it permits growth on solid media, whereby an idea can be formed of the number of colonies or the quantity of streptococci in the original material. He lays much stress on this point, as it is found that occasional colonies of streptococci are frequently found in cultures from normal skin, so that, unless a considerable number of colonies are present, it is not safe to assume that they are pathogenic. The author finds streptococci present in large numbers in practically all cases of the dry scaly patches mentioned above, which appears to confirm the view previously expressed as to their nature. He further points out that certain factors may cause irritation in these patches, such as exposure to light (as pointed out by Rasch), washing with soap, and the application of cold cream, vaseline, and lanoline—also such drugs as tincture of iodine and mercury. The eruption is not necessarily confined to the face, but may occur on the scalp, where it produces thick scaling, occasionally associated with loss of hair, which makes the diagnosis from ringworm necessary; also patches may occur on the neck and trunk and the limbs. On the hands the disease may resemble eczematoid ringworm. In his experience the patches readily disappear under **Zinc Ointment,** either alone or with the addition of 1 or 2 per cent **Coal-tar,** provided washing with soap is avoided.

REFERENCE.—[1]*Lancet*, 1927, ii, 370.

SKIN TRACTION IN GAPING WOUNDS. (*See* PLASTIC SURGERY.)

SMALL-POX.

J. D. Rolleston, M.D.

EPIDEMIOLOGY.—T. Clark,[1] senior surgeon of the United States Public Health Service, states that small-pox is widely spread in the United States except in the best vaccinated localities, but is so mild in character that vaccination has been largely given up. The disease attacks all classes of society, but naturally those living in overpopulated districts like negroes are most frequently infected. In the towns in the north and east the poorest immigrants have been protected by compulsory vaccination before embarking for America. Compulsory vaccination required at the frontier or port of entry by Mexico and South and Central America has greatly contributed to the reduction of small-pox in tourists and other travellers from North America to these countries and back.

According to the Annual Report of the Ministry of Health[2] the incidence of small-pox in England and Wales again showed a considerable increase in 1927, the number of cases being 14,787 as compared with 10,141 in 1926 and 5354 in 1925 (*see* MEDICAL ANNUAL, 1927, p. 457; 1928, p. 437). The counties chiefly affected were Durham (6446 cases), West Riding of Yorkshire (3244 cases), and Monmouthshire (1907 cases). The South of England remained comparatively free, but 515 occurred in Wales (apart from Monmouthshire), of which 455 were in the county of Glamorgan. The type of disease generally prevalent remained mild, but 49 deaths occurred, of which small-pox was one of the causes of death and in 36 instances the sole primary or immediate cause.

TREATMENT.—P. Teissier[3] speaks highly of **Xylol,** the action of which is threefold: (1) It causes the eruption to abort and prevents suppuration; (2) It acts as a deodorant; (3) It prevents the formation of scars. It has no action on early hæmorrhagic cases or malignant confluent small-pox. It is given in wine or milk in doses of 60 drops which are rapidly reduced to 20 or 10 drops a day in moderate cases. In severe confluent and late cases the dose should be 100 to 120 drops for men, 80 to 100 for women, and 20 to 50 for children. Teissier also advocates the use of **Convalescent Serum** or **Whole Blood** obtained from patients between the twenty-fifth and fortieth day, and injected subcutaneously and in severe cases intravenously in doses ranging from 25 to 100 c.c. The result is a rapid fall of temperature, slowing of the pulse, rise of blood-pressure, and general improvement.

REFERENCES.—[1]*Bull. de l'Office Internat. d'Hyg. Publ.* 1927, 1436; [2]*Ninth Ann. Rep. Min. Health*, 1927–8; [3]*Bull. méd.* 1928, 831.

SPINE, AFFECTIONS OF.

E. W. Hey Groves, M.S., F.R.C.S.

The Treatment of Tuberculous Spine in Children.—The opinion of those experts most qualified to judge about this matter is at the present time strongly in favour of conservative rather than operative methods. Thus French authorities, such as Rollier and Calvé, never use operative methods, whilst Allison in America goes to the greatest extreme in this direction in saying, "the great catastrophe of surgical tuberculosis is surgical interference." But

PLATE XLVII

SPINAL FIXATION IN TUBERCULOUS SPONDYLITIS

(S. A. GRANTHAM)

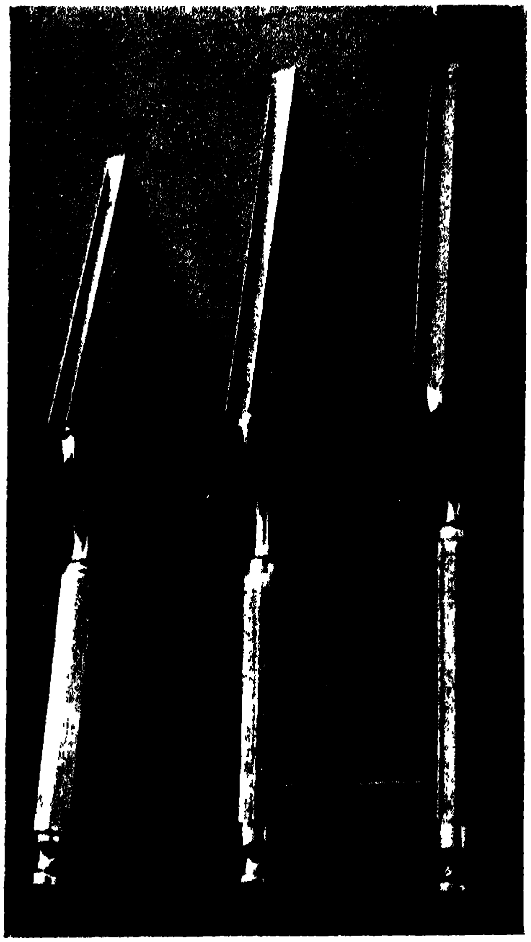


Fig. 1. Tunnelling osteotome, showing rectangular groove on ventral surface of blade

Plates XLVII and XLVIII by kind permission of the 'Journal of Bone and Joint Surgery.'

PLATE XLVIII

SPINAL FIXATION IN TUBERCULOUS SPONDYLITIS—*continued*

(S. A. GRANTHAM)

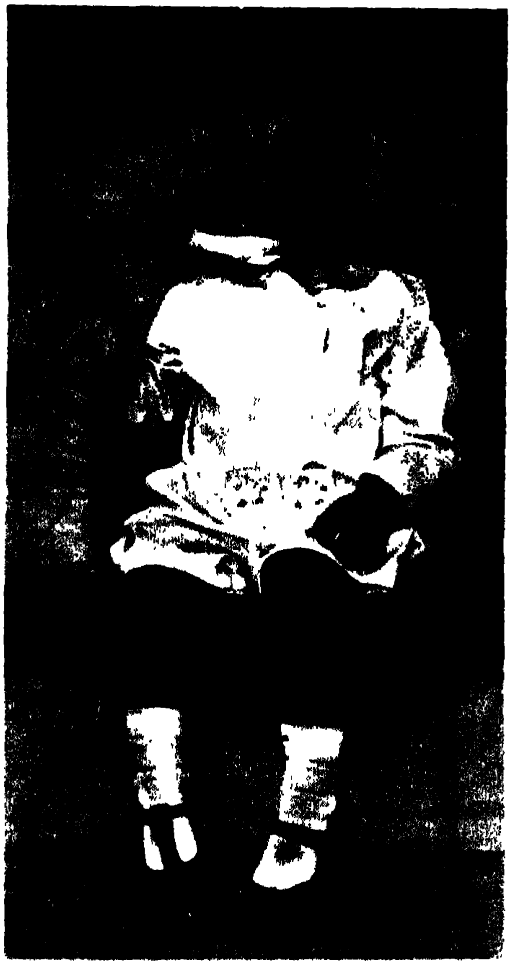


Fig. B. Patient, age [illegible], before operation. He is wearing a steel frame with a brace extended to support his head; his legs are helpless, and he is unable to walk.

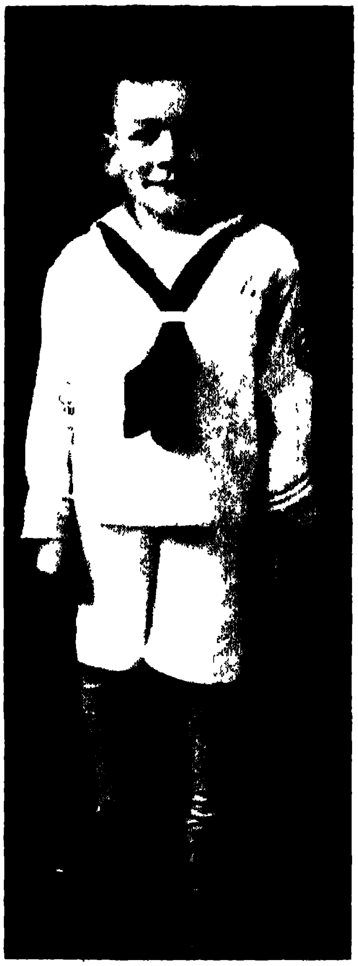


Fig. C. The same patient four months after operation. He is just returned from a shopping expedition with his mother.

it is acknowledged that under the most favourable circumstances treatment by recumbency takes anything from two to ten years to effect a cure in the sense of securing a bony union in the affected spine. It is not surprising, therefore, that when in 1911 Albee announced the possibility of cutting short the disease by the insertion of a bone-graft, this method was given a very extensive trial. But the general experience of the method in the case of children was one of disappointment, possibly because after the operation external fixation and recumbency were abandoned too soon. Then when a few years later Hibbs described his operation of spinal fusion another general attempt was made to cut short the disease. But in spite of the full and fair trial these methods have received, the general opinion to-day remains that attempts at fixation operations for tuberculous spines in children are not justified.

This opinion is supported by the careful observations of F. C. Kidner and F. Muro.[1] These observations are founded upon fourteen cases of children suffering from tuberculous spine, all of whom were placed under ideal conditions of sanatorium treatment. As nearly as possible the cases were divided into pairs, the members of each pair being similar in age and the character of disease. In half the cases a fusion operation by the Hibbs methods was done, and in the remainder only conservative measures were used. As the result of these observations these authors state that cases in which fusion has been done require practically as long and careful after-treatment as those without operation; that unoperated cases when cured have more flexible spines than operated ones; and that the possible shortening of convalescence does not justify the very real risk incident to operation.

All surgeons, however, are not content with the very tedious methods of conservative treatment, and S. A. Grantham,[2] for example, protests against the profession accepting the dictum of Dr. Allison quoted above. He considers that the failure of the bone-grafting operation in children is due partly to cutting the deep fascia of the back and thereby losing the support of this important structure. He has devised an extraordinarily simple operation and has described his results in six cases. The incision is only an inch in length, made transversely just below the spinous process of the second vertebra below the disease. Then by means of a special tunnelling osteotome (*Plate XLVII*) the tips of the spinous processes are cut off one by one until a point is reached two segments above the disease. The osteotome remains *in situ* whilst a tibial graft of the required length is cut of a width which fits the groove in the osteotome.* The graft is simply pushed in through this groove and the instrument is removed. The graft will then lie between the cut surfaces of the spinous processes and their severed tips. It is held in place solely by the tension of the fascia, no hæmorrhage occurring and no sutures being necessary except for the little skin incision. He claims that in cases in which this method has been used the patients are free from pain and require no further splinting after the end of a few months (*Plate XLVIII*). This method certainly has the merit of being extremely simple and ingenious. It must, however, be almost entirely limited in its applicability to those cases which have little or no spinal curvature. We await further reports of this method with great interest. (*See also* pp. 438 and 442.)

Fractures of the Spine: Kümmell's Disease. In regard to ordinary cases of fracture in which the diagnosis is clear from the outset, surgical opinion is becoming more definite every year. That is, there is a general agreement on two points: first, that all cases with evidence of a complete transverse lesion of the cord should be treated on simply conservative lines; second, that cases of fracture-dislocation without injury to the cord will have their return to functional activity greatly hastened by a timely bone-graft. But there is an intermediate group of cases which appear to be much commoner than at first supposed, where symptoms of cord irritation come on a long time after the injury, the nature of which was never suspected. This condition was first described by Kümmell, of Hamburg, in 1894, and has therefore since borne the name of *Kümmell's disease*. At first it was thought to be of excessive rarity, but now, owing partly to the exigencies of the Workmen's Compensation Act and partly to more frequent and better X-ray pictures, it is proved to be quite common. Thus J. Cardis, G. F. Walker, and R. H. Olver[3] have described no less than fourteen original cases. These all occurred in their own observation within the last five years. The case begins with a definite accident, either a direct blow on the spine or an indirect twist or contusion. Local pain may be accompanied by some evidence of spinal concussion, which may even present temporary paraplegia; but the first symptoms quickly pass away, and for a long period, usually six months to six years, he goes about his work without pain or suffering. Then at the end of this free interval the local symptoms of pain and tenderness, together with girdle pain and some degree of paraplegia, return. The final stage of the disease will be determined by its early recognition and treatment. If adequate fixation is given to the spine either by a brace or a bone-grafting operation, then a satisfactory recovery will follow; but if this treatment is neglected the condition may end in permanent paraplegia. Two aspects of this disease especially claim our attention. From a medico-legal viewpoint it is obvious that very important issues may be at stake, and it may be very difficult to persuade a judge or jury that symptoms coming on five or six years after an accident were really due to that cause. The key of the whole situation lies in the X-ray picture of the spine taken from the lateral aspect. This shows the body of one vertebra having a wedge shape, indicating that it has undergone compression (*Plate XLIX*). It is also exceedingly interesting to try and determine the pathological process which underlies this slow-moving disease. The present authors consider it to be of the nature of a rarefied osteitis caused by minute hæmorrhages at the time of the accident (*Plate L*). When the condition has been recognized, treatment should depend upon the circumstances of the case. In patients who are young and of active habits an efficient bone-graft is clearly indicated. In others a well-fitting spinal brace will give relief, although probably a period of recumbency in bed before getting up and wearing the brace will greatly add to the chances of a cure. (*See also* SPINE, FRACTURES OF.)

Sacro-iliac Strain. A great deal still continues to be written on the subject of strain, sprain, and subluxation of the sacro-iliac joints. In some respects points of doubt and difficulty are gradually being cleared up, but in others there continues to be a very wide difference of opinion. Two of these debatable points are dealt with in a very good article by H. Hoyt Cox,[4] under the title of "Sacro-iliac Subluxation as a Cause of Backache". Now we are free to confess that after reading this article we are more than ever convinced that there is no such thing as subluxation of the sacro-iliac joint. That there is a joint which permits a certain amount of movement no one has disputed, but when we ask for evidence that such a joint can become dislocated (apart, of course, from total separation), and when we are told that the most forcible manipulation can only produce a movement at the joint of 3 mm., we may be forgiven if we cannot recognize this as subluxation. It is no wonder that the advocates of this idea admit they cannot bring forward any X-ray support for their contention. The other point about which we would express an emphatic disagreement is that true sciatica associated with sacro-iliac strain can be caused by mechanical irritation of the lumbosacral cord where

PLATE XLIX

KUMMELL'S DISEASE

[illegible], G. F. WALKER, AND R. [illegible]

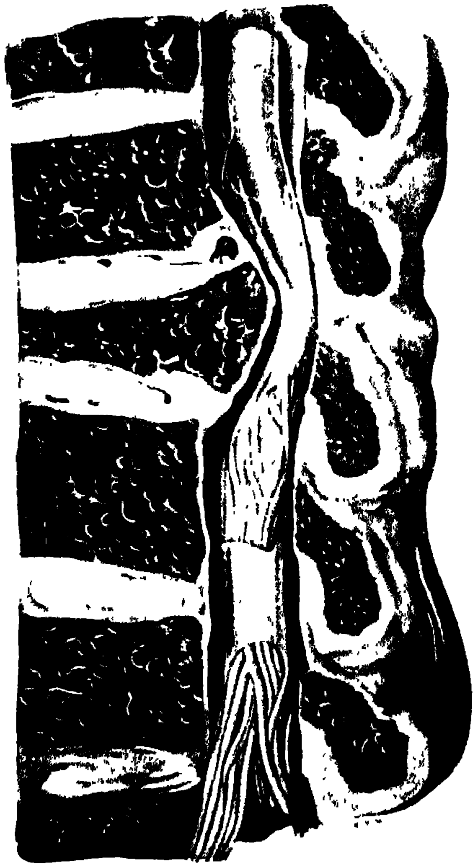


Fig. 1.—Pathological specimen showing the collapse of the vertebral body [illegible] cord interference.

Plates XLIX and L by kind permission of the
'British Journal of Surgery'

PLATE L

KÜMMELL'S DISEASE *continued*

G. L. CALDIS, G. E. WALKER AND R. H. OLVER

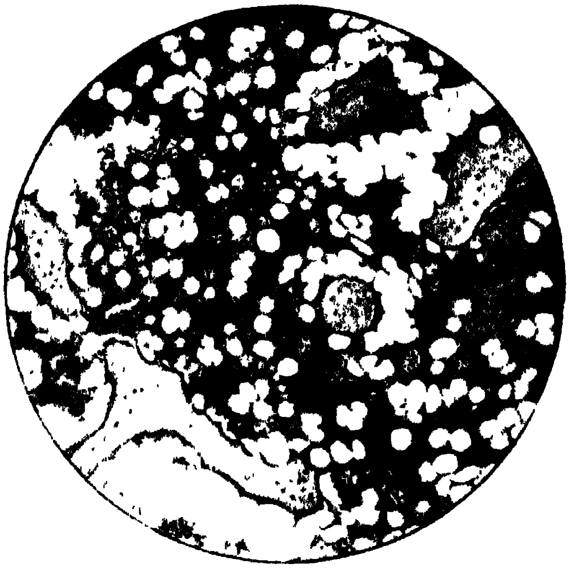


Fig. B.—Microscopic appearance of normal vertebral body structure.

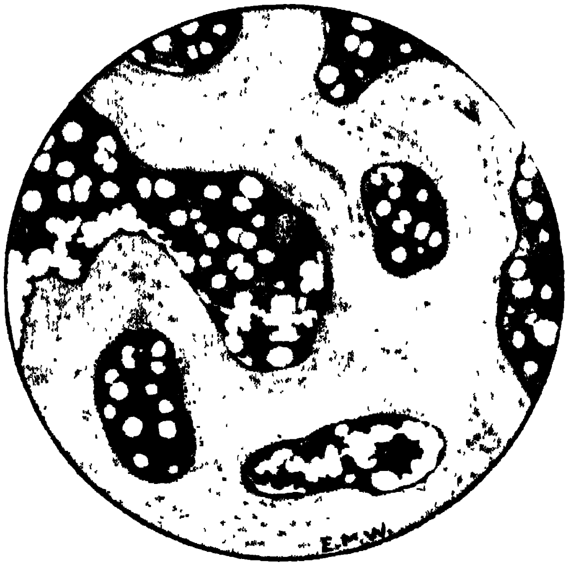


Fig. C.—Microscopic appearance of Kümmell's disease.

it passes over the brim of the pelvis. It is too much to ask us to imagine that pressure or stretching of the sacral plexus can be produced by a joint displacement of 3 mm.

If, however, we agree to drop the absurd idea of partial dislocation of the sacro-iliac joint and be content with the perfectly reasonable conception of a strain, then in regard to practical points of diagnosis and treatment there will be no serious difference of opinion, and we welcome Dr. Hoyt Cox's paper as a valuable contribution to a difficult subject. In regard to diagnosis, his most important suggestion is the pointing out that in these cases there is a diminution of the lumbar curve. Characteristic pain is caused over the joint by flexion of the thigh with the knee extended. This, together with the pain caused by the compression of the crests of the ilia and tenderness over the joint, should be enough to complete the diagnosis. The condition may be caused by either an acute strain or accident, or by a long-continued faulty position. Its commencement frequently coincides with pregnancy, and if the condition already exists pregnancy will greatly aggravate it. During pregnancy the condition should be treated by wearing a tight pelvic girdle which comes well below the level of the great trochanters. In regard to the treatment of the well-established condition, Hoyt Cox advocates special manipulation followed by strapping, a short period in bed, and diathermy. In this way he claims to have relieved or cured more than fifty out of sixty-five acute cases, and about thirteen of fifteen chronic cases. The main feature of his manipulative method consists in placing his patient face downwards on the table, and, whilst the patient supports himself on his chest and arms, the surgeon lifts his body off the table by the feet whilst an assistant presses downwards upon the sacrum (*Fig.* 77).

Fig. 77 - Treatment of sacro-iliac subluxation by manipulation of the patient. (*By kind permission of 'Surgery, Gynecology and Obstetrics'.*)

There are not wanting various new modifications of the methods of operative fixation of the sacro-iliac joint. One of these is described by W. C. Campbell,[5] and consists essentially in chiselling off the posterior portion of the crest of the ilium, making raw the adjacent surface of the sacrum, and covering in the raw surface with bone chips. F. J. Gaenslen[6] exposes the joint behind by splitting off the outer surface of the ilium and cutting a triangular opening down to the joint; this latter is filled up with bone chips and the outer leaf of the ilium is replaced (*Fig.* 78). E. A. Rich[7] employs an angulated graft which he places by the side of the

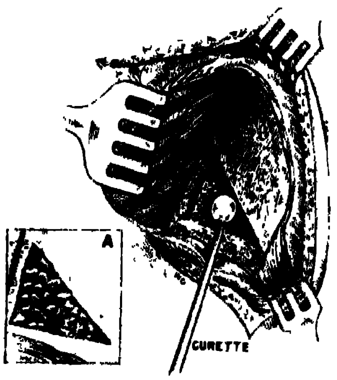


Fig. 78.—Sacro-iliac arthrodesis. Exposure of sacro-iliac joint and removal of articular surface with curette. The inset shows the joint packed firmly with healthy bone chips. (*Re-drawn from the 'Journal of the American Medical Association'.*)

spinous processes of the 5th lumbar vertebra and sacrum and then makes a bridge over to the adjacent ilium, thus stabilizing the lower lumbar spine as well as the sacro-iliac joint (*Plate LI*). He also recommends a method which will appeal much more to those who believe that sacro-iliac disorder is more in the nature of a strain than a dislocation. This consists in injecting 5 to 15 drops of a supersaturated **Tincture of Iodine** into the joint between the sacrum and the ilium (*Plate LII*). We think that this method has great possibilities in the relief of pain, though we should hesitate to accept the author's suggestion that it acts by producing "firm ankylosis".

. REFERENCES. [1]*Jour. Bone and Joint Surg.* 1927, Oct., 649 ; [2]*Ibid.* 748 ; [3]*Brit. Jour. Surg.* 1928, April, 616 ; [4]*Surg. Gynecol. and Obst.* 1927, Nov., 637 ; [5]*Ibid.* Aug., 218, [6]*Jour. Amer. Med. Assoc.* 1927, ii, 2031 ; [7]*Jour. Bone and Joint Surg.* 1928, July, 415.

SPINE, DISEASES AND INJURIES OF.

Sir W. I. de C. Wheeler, F.R.C.S.I.

Pott's Caries. In cases of tuberculosis of the spine it is well to remember that the spine may be affected simultaneously in more than one region. *Plate LIII* shows the radiographs of a case apparently cured by bone-grafting. The second and third lumbar vertebræ are seen to be firmly ankylosed. The space between the last dorsal and first lumbar is seen to be markedly diminished, and this was not recognized until the patient came back with signs and symptoms of spinal caries at the higher level. A second bone-graft was introduced, with an admirable clinical result.

Bone-grafting as part of the conservative treatment in adult cases of Pott's caries has been followed by more uniformly successful results than any other method of treatment. With modern technique the operative mortality is quite negligible. The reviewer[1] recently analysed the results of 30 consecutive advanced cases operated on in the ten-year period 1917 1927. In approximately 68 per cent of the cases the operation was followed by cure. All the cases were in an advanced stage : 5 had abscesses, 6 well-marked curvature, 7 both abscess and curvature, and one had complete paralysis and abscess at the time of operation. The average age of the patients when treatment was commenced was 26·3 years.

In the experience of the reviewer[1] the bone-graft never becomes absorbed when introduced into the healthy osseous groove occupied normally by the erector spinæ muscles (*Plate LIV*). Care must be taken, however, to prevent fracture of the graft by sudden twisting movement during the convalescent stage. The position of the patient for operation is shown in *Plate LV*. When taking the graft, the leg is acutely flexed and held by an assistant as shown in *Plate LVI*.

The treatment of children in modern open-air orthopædic hospitals, under the care of specially-trained orthopædic nurses, has been followed with such success that the operation of bone-grafting in young patients has not been thought necessary or desirable by many authorities. There is a tendency, however, in recent literature to recommend the operation in patients of all ages.

R. A. Hibbs and J. C. Risser[2] record 286 cases in the six-year period from 1915 to 1920 inclusive. Over 70 per cent were living and cured after fusion operation. The operative mortality was 0·5 per cent. These authorities state that any treatment to be most effective in vertebral tuberculosis must be applicable to children, as most cases occur in childhood, and they believe that children are the most favourable cases for operation ; fusion takes place more rapidly in them and their recuperative powers are better.

Whitman[3] does not hold this view regarding operation in children, and Girdlestone[4] states that in young children the operation is less reliable and at

PLATE LI

STABILIZING THE LOWER SPINE

[illegible]

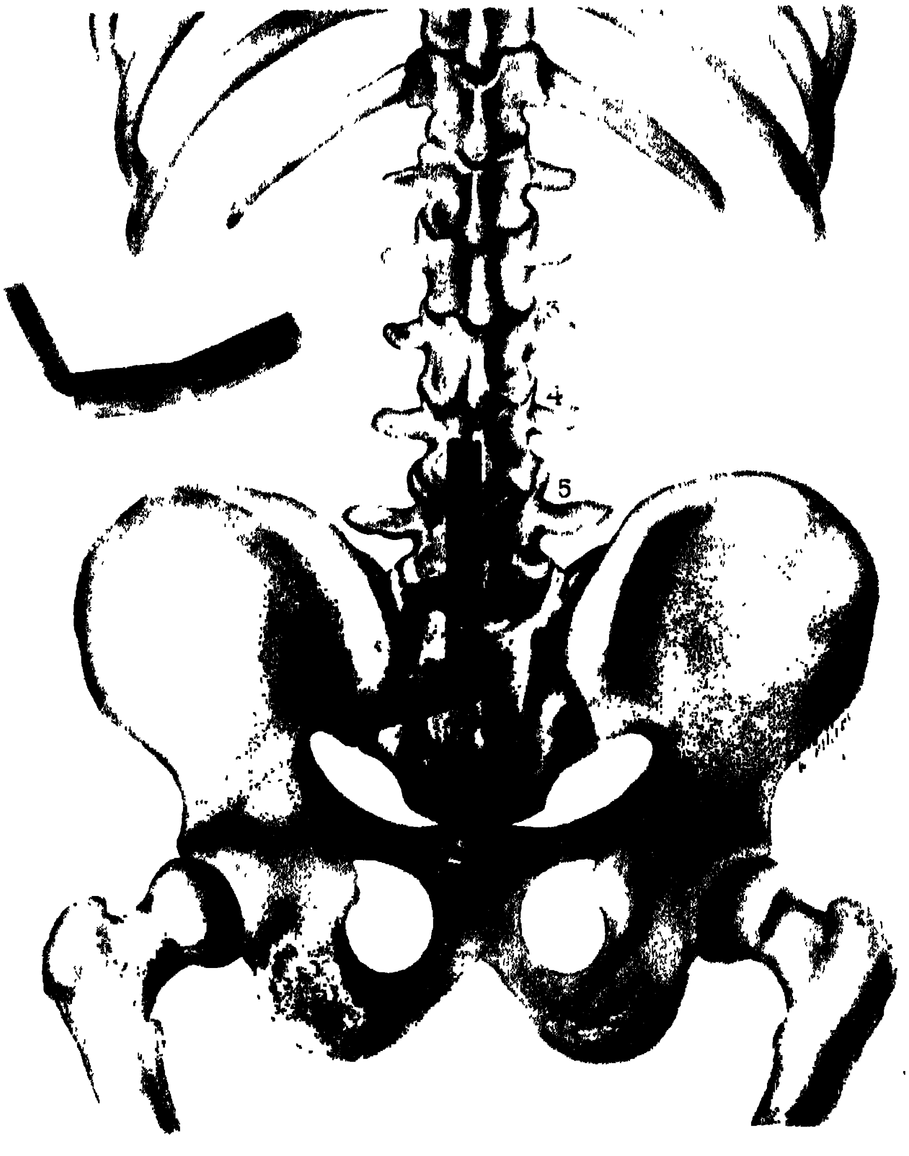


Fig. 1.—'Shotgun' graft to immobilize the lower spine and the sacro-iliac joint.

Plates LI and LII by kind permission of the
'Journal of Bone and Joint Surgery.'

PLATE LII

STABILIZING THE LOWER SPINE *continued*

E. A. Rich

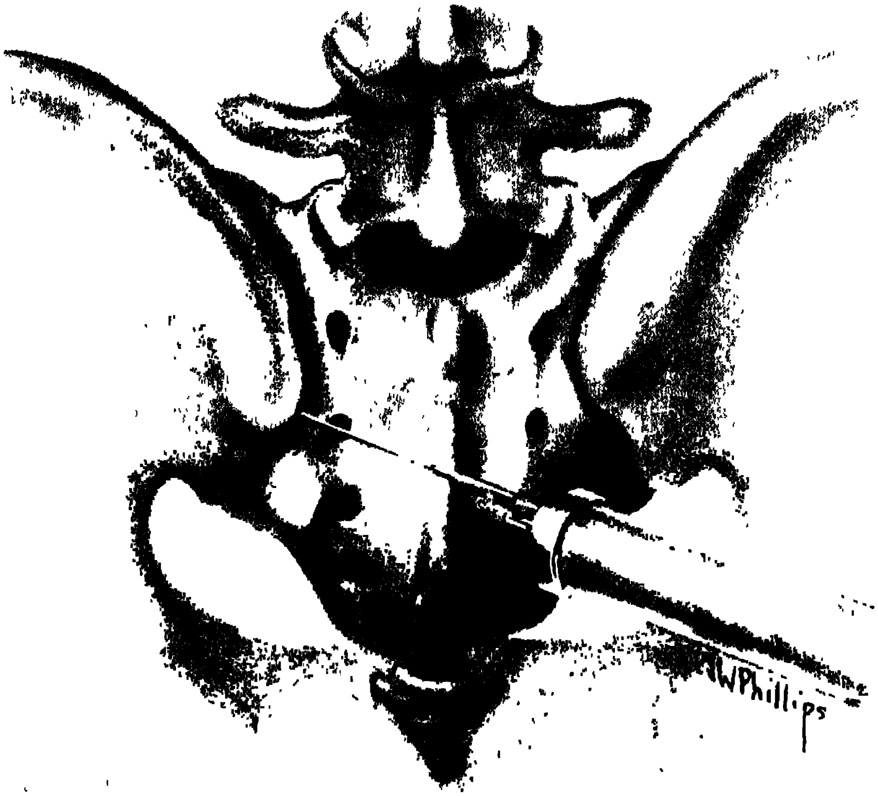


Fig. 7 — Chemical injection in sacroiliac joint disorder

PLATE LIII

BONE-GRAFTING IN POTT'S DISEASE

[illegible]

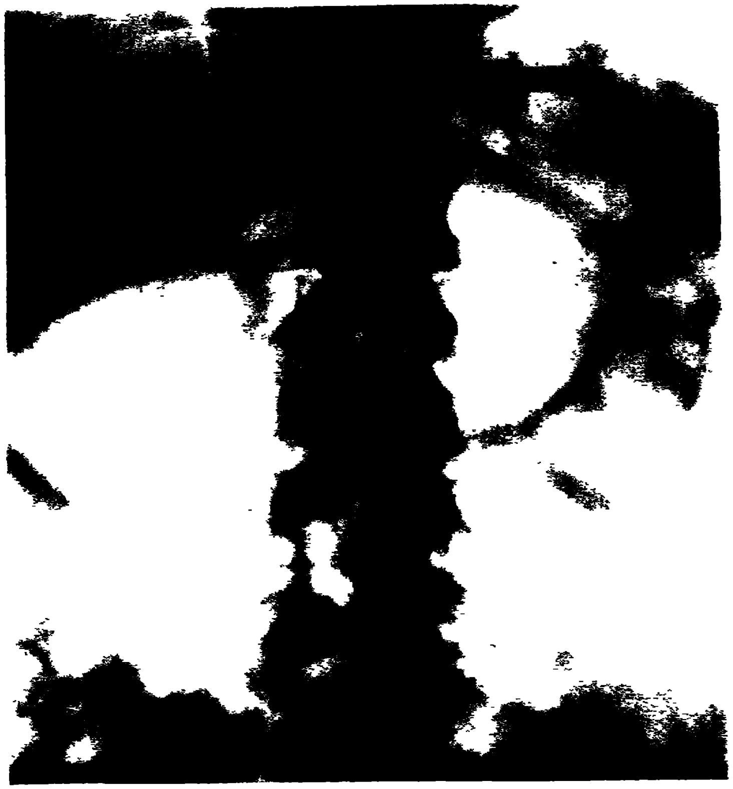


Fig. 1.—[illegible]

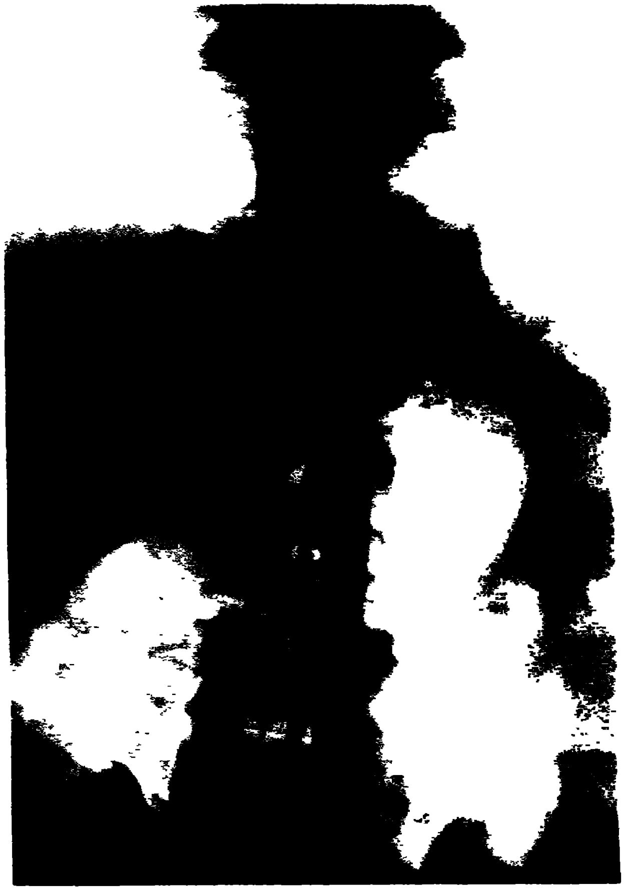


Fig. 2.—[illegible] upper lesion was recognized.

PLATE LIV

BONE-GRAFTING IN POTT'S DISEASE *continued*

(SIR W. I. DE COURCY WHEELER)

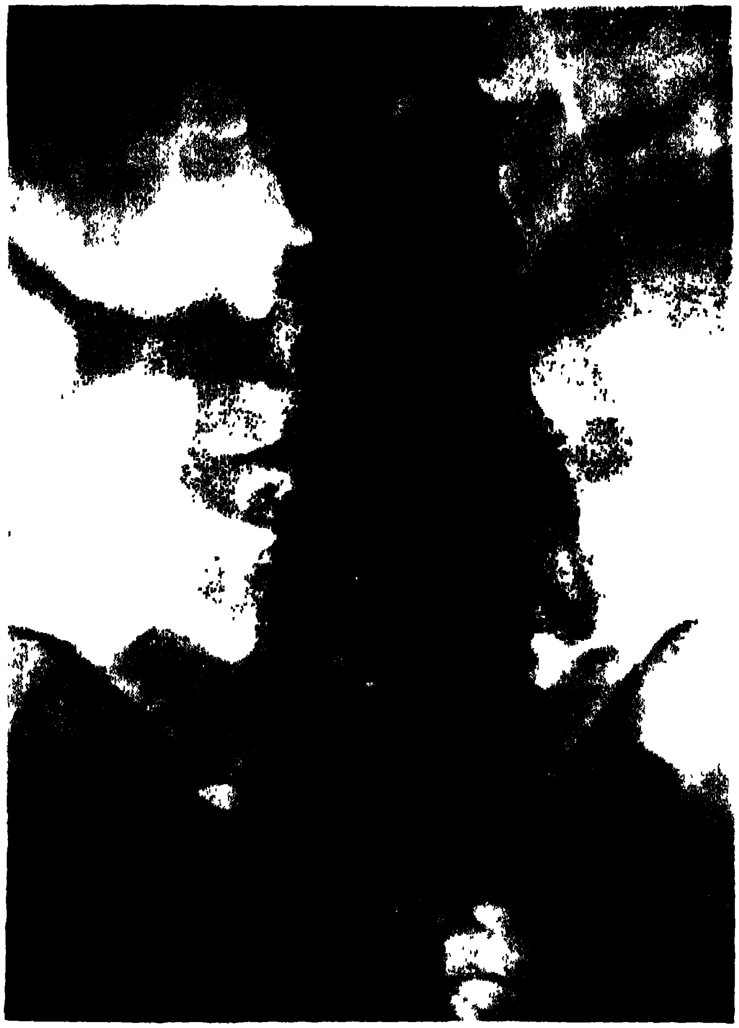


Fig. C.—Graft introduced for active disease in 4th and 5th lumbar vertebra. Eleven years later there was sound ankylosis and the patient was cured. The graft is unchanged.

Plates LIV–LVI from the 'Robert Jones Birthday Volume' by kind permission of the Oxford Medical Publications.

PLATE LV

BONE-GRAFTING IN POTT'S DISEASE

[illegible]

Fig. [illegible] in position for operation, show[illegible] [illegible] Note sand-bags under shoulders.

PLATE LVI

BONE-GRAFTING IN POTT'S DISEASE—*continued*

(SIR W. I. DE COURCY WHEELER)

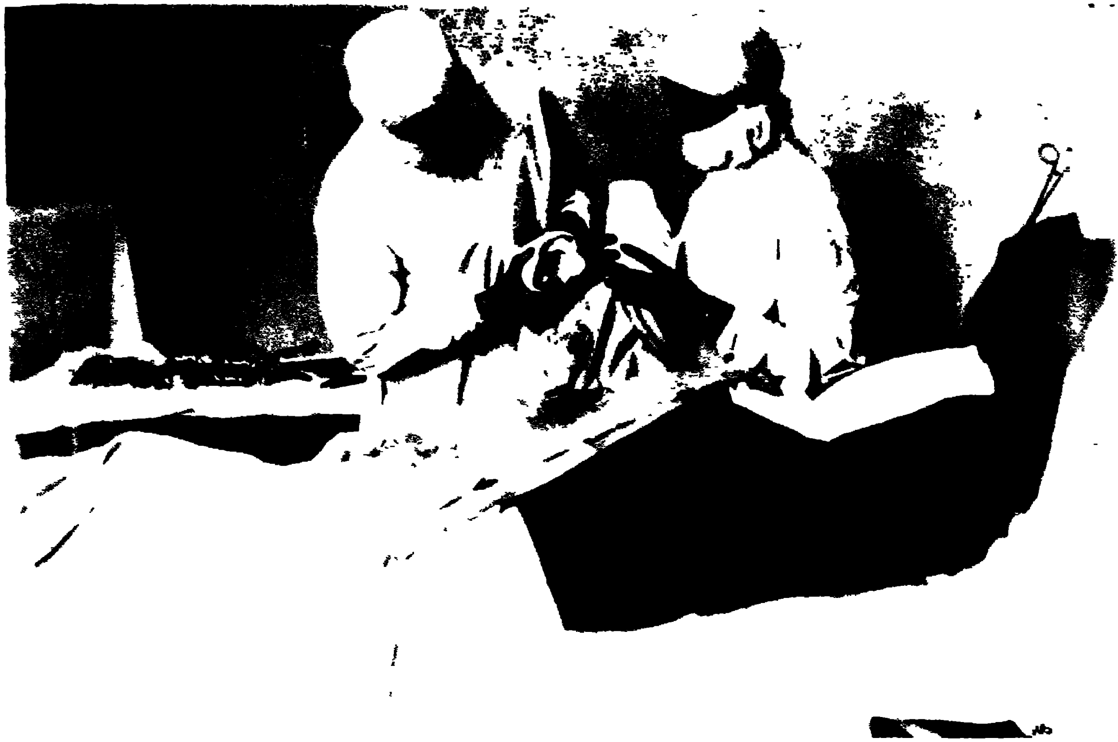


Fig. L.—The bed of the graft has been prepared; the wound is covered with a white towel. The graft is being cut from the tibia.

the same time less needed, and therefore seldom if ever indicated. The objection sometimes raised that operation in young children interferes with the future growth of the spine has no foundation in fact.

Injuries to the Cervical Vertebræ.—In cases of fractures of the cervical vertebræ from severe violence recently seen by the reviewer, the patients were not rendered unconscious by the violence which produced the injury. The retention of full consciousness enabled the differential diagnosis to be made between fractures of the base, intracranial hæmorrhage, etc., and injuries to the cervical vertebræ. Erichsen many years ago mentioned a case in which injuries to the spinal canal were complicated by fracture of the skull, and in such instances a real difficulty arises as to which symptoms are due to the one accident and which to the other. In one case trephined for a depressed fracture of the skull it was found at post-mortem examination that there was a fracture of the 5th cervical vertebra.

The reviewer had a case of a patient admitted to the Blackrock Ministry of Pensions Hospital after a fall on his head. Bleeding and ecchymosis shortly after the accident suggested that the patient was suffering from a fractured base. There was a lacerated wound over the right temple. It was soon discovered that he had partial paralysis of both legs. The knee-jerks were exaggerated; there were no Babinski signs and no ankle-clonus. The pupils were contracted as if morphia had been administered; they reacted to light; the temperature was normal and the pulse-rate was 80. The paralysis rapidly extended, and twelve hours later was complete in the legs. Soon the right arm became weaker than the left, but the muscles were capable of co-ordinated movement. The left arm became affected. Four hours later the right arm was completely paralysed. The left arm had become weaker and the abdomen and thorax ceased to move. The temperature was now 103° F. Respiration was carried on by movement of the diaphragm alone. The man remained fully conscious. This combined with the ever-increasing paralysis indicated that the lesion was not intracranial. Fracture of the cervical vertebræ below the 3rd vertebral body with hæmorrhage into the cord was suspected, but the man had moved his head freely backwards and forwards and from side to side; in fact there was no limitation of movement. Spinal puncture revealed the fact that the fluid was not under pressure and that it contained no blood. Ten hours later he suddenly complained of headache, vomited, became unconscious, and died. The final temperature was 109° F. A radiogram taken before death showed an injury in the nature of a sprain-fracture of the 4th, 5th, and 6th cervical vertebræ, without displacement. The lesion as found at post-mortem was produced by hyperextension of the neck. The intervertebral discs were torn open. Some insignificant fragments of bone were detached; there was no extradural hæmorrhage, nor was any blood extravasated beneath the meninges. The cord itself appeared intact. The paralysis was apparently caused by overstretching of the cord, but it is difficult to explain why there was not complete paralysis until about sixteen hours after the injury.

The points of interest were: (1) The suspicion that the man was suffering from a head injury—a suspicion that was at once dispelled by the presence of wide paralysis in the absence of unconsciousness; (2) The free movement of the head in the presence of such an injury; (3) The contracted pupils as is characteristic of severe injuries in the lower cervical region; (4) The uppermost lesion in the spinal column was just below the origin of the phrenic nerve, hence respiration was possible by means of the diaphragm; (5) The wide variations of temperature which are usual in lesions in this situation. The contracted pupils in this and similar cases is an interesting phenomenon. It is due to the paralysis of the pupil-dilating fibres of the sympathetic nerve; these leave the cord by the anterior nerve-roots from the 5th cervical to the 5th thoracic, and pass to the last cervical and 1st thoracic ganglia of the sympathetic; thence they pass through the cervical sympathetic to the Gasserian ganglion, and reach the iris in the ciliary branches of the ophthalmic division of the 5th nerve. The contraction of the pupil may be accompanied by narrowing of the palpebral fissure from paralysis of the involuntary muscular tissue which is present in both the upper and lower lids. Erichsen gives an excellent description of this mechanism.

In a case of fracture-dislocation at present under treatment in Mercer's Hospital, Dublin, the body of the 7th cervical vertebra is fractured and the body of the 6th is displaced forward. The lesion was only diagnosed after X-ray examination. The patient had no signs or symptoms whatsoever except stiffness in the muscles and loss of movement in the neck. Fracture-dislocation occurs most often in the lower cervical or dorsal-lumbar region. The gravity of the case is in proportion to the damage done to the spinal cord. Fracture or fracture-dislocation *per se* is not necessarily followed by untoward results.

REFERENCES. [1]*Robert Jones Birthday Volume*, Oxford Med. Publications, 325; [2]*Jour. Bone and Joint Surg.* 1928, Oct., 805; [3]*Robert Jones Birthday Volume*, 331; [4]*Brit. Jour. Surg.* 1923, Jan., 372.

SPINE, FRACTURES OF. (*See also* ATLAS, INJURIES OF, and pp. 435, 439.)

Geoffrey Jefferson, M.S., F.R.C.S.

The very mention of fractures of the spine so often conjures up in the mind a picture of hopelessness, a paralysed and incontinent patient with a brief expectation of life, that it is perhaps pardonable to inquire what new thing can be said concerning them. And yet it is a fact that we are by degrees learning a great deal about these troublesome injuries. We know now that there are sites of election for fracture, that injuries in this or in that region are common whilst they are rarer elsewhere, and we are nearer the explanation of their mechanism and the reasons for their special incidence. It is of particular importance that the 'critical points' where injuries are most apt to occur should be learned, not because everybody is interested or even ought to be interested in mechanical problems, but because if we are forewarned on these fundamentals we are forearmed in diagnosis, and will more probably come easily to a correct opinion on any given case which we may see.

The 'Critical Points' in the Vertebral Column. An analysis of a large number of cases brings out very clearly that injuries of the vertebræ most often occur in the cervical region, and again at the 12th thoracic and 1st lumbar, as will be seen from *Fig.* 79, which is a graph of 2006 cases. Injuries in the thoracic region are rare, though it is about the mid-thoracic spine that they are generally thought to be most common. And so they would be if the spine were a simple column of vertebræ with no differences in the mobility of its various parts. The fact is that the many experiments in spinal mechanics which accidents unhappily carry out for us every year show that injury rarely occurs in the thoracic portion of the spine. On the other hand, injuries are very common in the cervical portion, the most frequent finding being a dislocation between the 5th and 6th vertebræ. The injury is usually produced by force applied to the head, as in many domestic accidents or in those of the playing and sporting fields. The force may be sufficient to render the patient unconscious from concussion, and in such cases the spinal injury may easily be overlooked. Attention is apt to be focused on the head injury; the pain in the neck of which the patient later complains is then regarded as some vague sequela of the more obvious state which preceded it. This is the more apt to be the case when no cord damage accompanies the cervical dislocation. We know to-day that cervical dislocation occurs more often without cord injury than with it, so that there is a very real danger of overlooking a dislocation which after two or three weeks becomes almost impossible of reduction and a source of persistent pain.

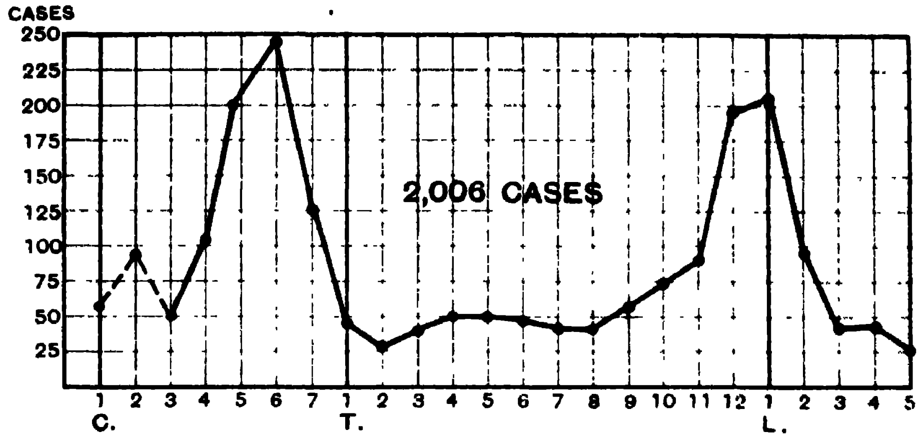


Fig 79.—Graph of the localization of spinal injury from 2006 cases in the literature (Jefferson[1]). Note the 'critical points'. (*Re-drawn from the 'Proceedings of the Royal Society of Medicine'.*)

The next most frequent site of injury is the thoracolumbar junction Fracture at this point is the result of industrial and heavy labouring accidents The so common selection of this region for fracture is due to the fact that the thoracic spine tends to flex as a whole beneath a heavy weight applied to the shoulders, as on a hinge situated at its lower end where it joins the lumbar column. Here again fracture of the vertebral body more often occurs without nervous damage than with it, giving rise to the characteristic wedging of the vertebral body—the classical compression fracture.

The fact that vertebral injury can only accurately be diagnosed by means of X rays serves as one more reminder to the practitioner of the onus which weighs on him. It is surprising how well some of these patients may appear to be a state apt to lull the suspicions of the medical attendant when no nerve damage is apparent to correct him. This is well brought out by a consideration of Kümmell's disease (*see* p. 435). Apropos of the subject of X rays, it cannot be too strongly insisted that lateral views are much more instructive than anteroposterior and must always be obtained.

Queckenstedt's Test (*see* MEDICAL ANNUAL, 1927, p. 461).—Adson and Coleman advocate the use of this test to distinguish the compressed case ; but there are many fallacies, for even if jugular compression should cause no rise in the cerebrospinal fluid pressure in the lumbar manometer (denoting a block and presumably compression of the cord), it by no means follows that the cord is not irreparably damaged so that operation could be of little service.

Treatment of Spinal Injuries. The discussion at the Royal Society of Medicine in February, 1928,[1] showed an unusual unanimity of opinion as to treatment. Collective experience seems to show beyond reasonable doubt that cord damage, when it occurs, is produced at the moment of injury, and that the problem is not one of cord compression, but of cord laceration or hæmatomyelia. That is to say, the problem is insoluble, and operation, particularly laminectomy, is not likely to do much good. Reduction of the dislocation is good treatment so far as the bone injury goes, but one must bear clearly in mind what one hopes to do, and with a totally paralysed patient one can hope for very little. Certain it is that immediate operation does not save life. Intervention can only be considered later with a view to improving function, the prospects varying inversely with the degree of nerve injury. Conservative methods give good results as a rule, and only the most carefully studied cases should be submitted to operation.

End-results in Spinal Injury. Atha Thomas[2] gives an important summary of the result of 100 cases of spinal injury; most of them involved the thoraco-lumbar junction, as did R. B. Osgood's[3] (76 per cent in Thomas's series and 70 to 80 per cent in Osgood's). The actual percentage of incidence in any series must vary, depending on the type of case the hospital or clinic chiefly deals with. In heavy labouring districts the injuries will chiefly be at the thoraco-lumbar junction. In other services the cervicals may be as common or more so. But one point stands out clearly, as was noted above, that the thoracic vertebræ from the 1st to the 10th are not often injured.

Of Thomas's 100 cases (in 17 the fractures were limited to the transverse processes and may be excluded), 18 died, all with nervous tissue involved; a further 18 were totally and permanently incapacitated; whilst 19 returned to the same work that they did before. He remarks that of the pure crush fractures of the bodies of the vertebræ without cord lesion, 55 per cent were disabled to some degree, averaging about 50 per cent of their former capacity. Of Brackett, Mixter, and Osgood's series in 1918, 82 per cent showed persistent partial disablement. From the medico-legal aspect these fractures without cord damage—injuries which are apt to be missed form a most important group. Disability is apt to follow, but early recognition with adequate fixation in plaster should improve the results in the future. Eventually it may well prove to be the fact that the result depends chiefly on the extent to which the bone was crushed at the time. The writer's own experience is that, even with the most careful treatment at the time, considerable disability follows in many cases. When this often inevitable disability occurs in cases in which the original injury was overlooked, the surgeon or practitioner cannot well defend himself, although maybe the result would have been very similar whatever had been done.

References. [1]*Proc. Roy. Soc. Med.* 1928, Feb., 625; [2]*Colorado Med.* 1928, Jan., 19; [3]*Jour. Amer. Med. Assoc.* 1927, ii. 1563.

SPINE, TUBERCULOSIS OF. (*See also* SPINE, AFFECTIONS OF; SPINE, DISEASES AND INJURIES OF.)

John Fraser, Ch.M., F.R.C.S.Ed.

Conservative Treatment. L. S. Fry,[1] recognizing the difficulties in securing complete immobilization of young children suffering from Pott's disease, recommends a **Plaster Bed or Boat** (*Fig.* 80). The appliance is modelled on the child's body while it lies on its face, it extends from the head to immediately above

Fig. 80. Showing child lying in plaster boat recommended by L. S. Fry.
(*By kind permission of the 'Lancet'.*)

the knees, and it is mounted upon two wooden blocks which raise the structure above the level of the bed and so permit the use of the bed-pan. The shell is applied with the spinal column in slight extension and the limbs abducted. By the suitable application of leather pads it is possible to secure some degree of correction of the kyphosis error. The principle is that of the Calôt plaster shell, and it affords excellent fixation of the affected parts. The difficulty in its use is the growth of the child, which necessitates renewal of the appliance every few months.

Operative Treatment. Gauchet[2] describes a modification of the **Hibbs Osteosynthetizing Operation** for spinal tuberculosis. The Hibbs technique is modified by replacing the division of the articular processes (often a difficult and sometimes a risky procedure) by the method of placing in the paraspinal grooves osteoperiosteal grafts taken from the tibia. Gauchet states that he adopted this procedure because he found that division of the articular processes is apt to be followed by sequestrum formation, and it has been his experience that the paraspinal grafts afford as complete fixation as any other variety of osteosynthetizing operation. The procedure was carried through in twenty-one cases, there was no mortality, and the results were classed as good in 95 per cent of cases. The method of paraspinal grafts is already in vogue in several orthopædic centres in this country.

REFERENCES. [1]*Lancet*, 1928, i, 600; [2]*Presse méd.* 1927, Sept. 21, 1151.

SPIROCHÆTOSIS ICTEROHÆMORRHAGICA. (*See* JAUNDICE, INFECTIVE.)

SPLEEN, SURGICAL AFFECTIONS OF. *A. Rendle Short, M.D., F.R.C.S.*

Indications for Splenectomy.—As this subject was considered somewhat fully in the MEDICAL ANNUAL for 1928, we shall be content this year to mention the principal papers dealing with it, all of which are to much the same effect. The authors are Graziani,[1] Émile Weil and R. Grégoire,[2] D. P. D. Wilkie,[3] and a congress of French surgeons.[4]

Results of Splenectomy. H. Z. Giffin[5] gives the experience of the Mayo Clinic, brought up to date, on this subject. The results may be given in tabular form as follows, though in some cases the data are not clear:—

Table I. SPLENECTOMY FOR MAIN GROUPS OF CASES (VARIOUS PERIODS OF YEARS).

DISEASE	PATIENTS	DEATHS		LIVING
		Hospital	Subsequent	
Splenic anæmia	123	15	43	60
Chronic septic splenomegaly .	27	7	7	2
Cirrhosis of liver	35	7	16	10
Syphilitic splenomegaly	10	1	2	7
Hæmolytic jaundice	81	1	7	68
Pernicious anæmia	62	4	55*	3
Myelogenous leukæmia .	43	3	37*	3
Lymphocytic hyperplasia .	7	0	4	2
Polycythæmia vera	1	0	0	1
Hæmorrhagic purpura	20	0	—	—
Acute aplastic anæmia .	3	3	0	0

* Apparently: not definitely stated.

In all the above figures, some of the subsequent deaths are from totally unrelated causes. It will be noted that excellent results are obtained in splenic anæmia, hæmolytic jaundice, and hæmorrhagic purpura. For cirrhosis of the liver, pernicious anæmia, and leukæmia it is only occasionally worth while to remove the spleen. In myelogenous leukæmia the operation is only safe after reducing the spleen with radium and X rays. After operation, the leucocyte count remains lower and the anæmia is less, and they respond better to other remedies. Twenty cases lived over two years. P. Lecène and C. Aubertin[6] write to much the same effect.

Giffin gives further statistics for miscellaneous cases of splenectomy, as follows: -

Table II. SPLENECTOMY FOR MISCELLANEOUS GROUP (APRIL 1, 1904, TO JANUARY 1, 1927).

DISEASE	PATIENTS	DEATHS		LIVING
		Hospital	Subsequent	
Tuberculosis of the spleen	8*	1	1	4
Gaucher's disease (longest 18 years and 7 *months*)	6†	2	1	2
Ruptured spleen	4	1	0	3
Wandering spleen (longest 18½ years)	2	0	0	2
Indeterminate hæmorrhagic disease	3	0	0	3
Acute aplastic anæmia	3	0	3	0
Chronic aplastic anæmia .. .	2	0	1	1
Chronic hæmolytic anæmia	1	0	0	1
Acute and subacute septic splenomegaly	2	0	2	0
Hodgkin's disease	1	0	1	0
Eosinophilia with splenomegaly	1	0	1	0
Neutrophilia with splenomegaly ..	1	1	0	0
Hæmorrhagic cysts	2	0	1	1
Hæmangioma	1	0	1	0
Secondary splenectomy	7	0	2	5
Unclassified	3	1	2	0

* Two patients not heard from. † One patient not heard from.

Rupture of the Spleen. Hamilton Bailey[7] reviews 32 cases of *rupture following injury* to the normal spleen. The patients may be grouped under four headings: (1) Those rapidly succumbing 3 cases; (2) Those with initial shock, followed by improvement, then later signs of ruptured spleen-- 23 cases; (3) The delayed type - 6 cases; (4) Those in which spontaneous recovery is said to occur.

There is often an initial loss of consciousness for a short time. Vomiting is unusual. The best sign is a rising pulse-rate. Rigidity over the spleen, local tenderness, and shifting dullness are nearly always present. Much less constant signs are: falling hæmoglobin count, fixed dullness in the right flank, and Kehr's sign referred pain in the left shoulder. Needless to say, the third group above described may be very deceptive. In doubtful cases, a button-hole incision is of value to determine the presence of free blood. As a rule the left paramedian incision is best for splenectomy. In recent years the great majority of the patients have recovered.

M. P. Susman[8] reports a case of *spontaneous rupture of the normal spleen.* His patient, a grocer, age 53, was bending to lift a bucket of water when the catastrophe occurred. He died. About six other cases are known.

REFERENCES. -[1]*Policlinico*, 1928, June, 325; [2]*Bull. et Mém. Soc. Nat. de Chir.* 1927, July 2, 935, and *Presse méd.* 1927, July 27, 937; [3]*Edin. Med. Jour.* 1927, July, 117; [4]*Presse méd.* 1927, Oct., 1297; [5]*Surg. Gynecol. and Obst.* 1927, Nov., 577; [6]*Presse méd.* 1928, Jan. 14, 49; [7]*Brit. Jour. Surg.* 1927, July, 40; [8]*Ibid.* 47.

SPRUE. *Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.*

ETIOLOGY.—Researches on this difficult subject have been continued at the Bombay Bacteriological Laboratory with the following results. S. S. Sokhey, S. K. Gokhale, M. A. Malandkar, and H. S. Bilimoria[1] have tested the liver function in 13 typical sprue cases by the levulose tolerance test, the van den Bergh reaction, nitrogen partition of the blood, and the bromsulphalein dye test, and, except in one nearly moribund patient, they found no impairment of the liver functions. Sokhey and Malandkar[2] have likewise tested the pancreatic functions in sprue cases, and found no deficiency in the form of defective fat splitting, but fat absorption was defective owing to the bowel contents being hurried along; they do not regard the changes in the fatty contents of sprue stools as in any way specific or of diagnostic value. Moreover, the duodenal contents showed normal amounts of diastase, trypsin, and lipase, so they conclude that the function of the pancreas, as far as its external secretions are concerned, is normal in sprue.

F. P. Mackie and G. D. Chitre[3,4] report an extensive series of animal experiments to test if they can be infected with sprue by monilia cultures from the bowel contents of cases. A total of 91 animals, including monkeys, guinea-pigs, rabbits, and white mice, was used, and also cultures from Ashford's laboratory. They concluded that nothing like sprue was ever produced, but intraperitoneal injections produced fatal peritonitis in a few instances; peritonitis was usually recovered from. Feeding experiments were negative and are of little value, as Ashford's monilia is often found in healthy animals. They next induced a scorbutic or semi-scorbutic state in monkeys by a diet deficient in vitamin C, and fed the animals with monilia, and although they showed no bowel symptoms of dysentery during life, extensive ulceration of the large bowel was found post mortem. Further investigation showed that this occurred equally in control monkeys fed on a vitamin C deficient diet without any monilia being given, so it is clearly the result of defective diet alone, and they failed to produce sprue in monkeys or other laboratory animals.

The same authors, together with S. N. Gore and J. H. Wadia,[5] also deal with the bacteriology of 30 cases of sprue; in 2 cases a bacterium was found in both the blood and in the intestinal contents, and this is being studied further. Since 1924 they have examined 92 specimens of stools and 6 of duodenal contents, and an analysis of the findings in 51 is given. In not one was a recognized pathogenic organism found. The duodenal contents often showed the presence of bacteria, including hæmolytic cocci and a hæmolytic streptothrix, but none could be identified with recognized pathogenic bacteria.

Atypical sprue is dealt with by A. C. Reed and J. E. Ash,[6] in which sprue-like gastro-intestinal disturbances are combined with *anæmia* approaching the pernicious type, and nervous phenomena characteristic of subacute myelinic degeneration of the spinal cord, or any combination of these groups of symptoms. These atypical cases are thought to be due to gastro-intestinal toxins, and they are seen chiefly in white races who have resided in the tropics. E. A. Baumgartner and G. D. Smith[7] discuss the relation between sprue and pernicious malaria. In fifteen cases of sprue they found achlorhydria with anæmia accompanied by a high colour index, but less marked red corpuscle changes than in true pernicious anæmia, and no evidence of degeneration of the posterior column of the spinal cord; numbness and tingling, however, may be present, and greater loss of weight than in the blood disease, so they do not think that sprue is late pernicious anæmia.

G. C. Low[8] describes a case of severe anæmia in sprue which yielded to a **Transfusion of Blood.** [The writer had a similar case a year ago in which a blood transfusion saved the life of a sprue patient, with ultimate recovery. L. R.] P. H. Manson-Bahr[9] records an isolated case of sprue originating in Nyasaland.

REFERENCES. [1] *Ind. Jour. Med. Research*, 1928, Jan., 553; [2] *Ibid.* 1928, April, 921; [3] *Ibid.* 1928, July, 49; [4] *Ibid.* 77; [5] *Ibid.* 95; [6] *Arch. of Internal Med.* 1927, Dec., 786; [7] *Ibid.* 1927, Aug., 203; [8] *Lancet*, 1927, ii, 960; [9] *Trans. Roy. Soc. Trop. Med.* 1928, June 30, 81.

STAPHYLOCOCCAL INFECTION. (*See also* SKIN, STAPHYLOCOCCAL INFECTIONS OF.)

J. D. Rolleston, M.D.

J. Aris,[1] who records five cases of staphylococcal septicæmia, in patients from 18 to 40 years of age, three of which were fatal, states that boils of the face, especially on the upper lip, alæ nasi, cheek, and chin, are the chief cause of the condition. This form of septicæmia is due to a superinfection rather than to an auto-infection. Blood cultures will show whether the staphylococcus is alone responsible or if it is associated with the streptococcus. An early diagnosis is essential, and is founded on the rapid swelling of the tissues surrounding the boil, the throbbing and lancinating character of the pain, shivering, and the sudden development of a high temperature. The knife should be avoided, as in the absence of pus it opens up channels to microbial invasion. **Deep Linear Cauterizations** should be made on one or both sides according to the case. Fixation abscesses have also proved useful.

REFERENCE. [1] *Rev. med. de Barcelona*, 1927, 239.

STERILITY. (*See* TUBAL PATENCY.)

STERILIZATION OF THE SKIN. (*See* PRE- AND POST-OPERATIVE TREATMENT.)

STOMACH, CANCER OF.

A. Rendle Short, M.D., F.R.C.S.

Origin of Cancer from Ulcer. P. Duval and F. Moutier[1] believe that this transformation is not nearly as frequent as they formerly held. A microscopical diagnosis of cancerization of an ulcer is not always reliable, and different pathologists give varying opinions. In a first series, 1908–14, out of 49 cases of ulcer, 44 per cent were regarded as malignant. In a second series, 1922–7, out of 86 ulcers, only 3 (that is 3·57 per cent) were returned as cancerous. A re-examination of the older series of sections reduced the percentage from 44 to 25·58. The great disparity which still exists between the two series is attributed to the fact that gastric ulcer is much better treated medically, and also much earlier operated on now, than twenty years ago. Out of 98 cases of cancer of the stomach, 17 appeared to arise in ulcer. H. Finsterer[2] finds that 21 per cent of the ulcers of the stomach he resects prove to be malignant. W. J. M. Scott[3] remarks that the most important point to bear in mind is that there is a type of ulcer-cancer which cannot be distinguished from innocent ulcer by symptoms, physical signs, or X rays. This is a strong indication for early removal.

Colloid Cancer. J. W. Stinson[4] shows that this variety constitutes about 5 per cent of the whole. The prognosis after excision is much about the same as for non-colloid cancer.

Technique of Operation.—Remarking that gastro-enterostomy, followed later by resection, is apt to give a bad lie for the anastomosis, D. C. Balfour[5] describes a better method when a two-stage resection is indicated to limit risk in a poor subject. At the first stage he clamps and cuts across the stomach as usual, and, without resecting the pyloric portion, performs an end-to-side junction of the stomach to the jejunum as in the Polya operation. A fortnight later the pyloric portion, containing the growth, is removed.

E. Borchers[6] reports a successful case of resection of the upper half of the stomach for cancer. The œsophagus was applied to the pyloric end of the stomach, as long a piece as possible of the œsophagus being covered in. The stomach was sewn to the diaphragm.

End-results of Surgical Treatment of Gastric Cancer. F. B. St. John[7] reports on thirty-two cases treated by resection at the Presbyterian Hospital, New York, between 1916 and 1926. The death-rate was 43·75 per cent. Of the eighteen survivors, nine are living. Four are symptom-free upwards of five years after, and another is alive but not symptom-free. Another five are alive less than five years, of which three are symptom-free.

M. Persson[8] gives data concerning 1150 cases of gastric cancer operated on in Stockholm between 1887 and 1926: 361 were resections, mortality 28 per cent; 450 were gastro-enterostomies, mortality 23·1 per cent; 339 were explorations, mortality 17·1 per cent. The operative mortality for resection in men was 33 per cent; in women 21 per cent. The deaths were from abdominal complications in 19·6 per cent of cases, from pulmonary complications in 5 per cent. The best immediate results were given by the Billroth II method; it was definitely superior to the Billroth I or Polya. The follow-up of patients operated on upwards of five years before showed, in 200 cases: 161 (80·5 per cent) died within five years, all except 2 of relapse; 12 died of relapse over five years; 9 died of intercurrent disease over five years; 18 are still living, 17 of them well. In none of the eighteen just mentioned were there any malignant lymphatic glands found. The best eventual results follow Polya and Billroth II, not Billroth I. These statistics are amongst the most reliable and extensive on record.

Cancer of the Duodenum. A study of cancer of the ampullary region of the duodenum is contributed by I. Cohen and R. Colp.[9] The dominant symptom is jaundice. Pain is absent at first, cachexia and wasting are marked. The gall-bladder is enlarged. The duodenal contents obtained by tube may show blood. It is usually impossible to tell whether the cancer involves the head of the pancreas or the ampulla of Vater, and, if the patient is fit, exploration is desirable because the growth may be removable. Nine or ten cases are reported in the literature alive and well for years after such removal. Details are furnished of fifty-nine cases treated by various surgeons. The exploration and removal are through the duodenum. The gall-bladder is united to the stomach or duodenum if the bile-duct cannot be re-implanted into the duodenum; if that is possible, it is of course best, but temporary cholecystostomy to relieve pressure is useful.

REFERENCES.—[1]*Bull. et Mém. Soc. nat. de Chir.* 1928, March 21, 423; [2]*Wien. klin. Woch.* 1927, June 16, 799; [3]*Surg. Gynecol. and Obst.* 1928, Feb., 199; [4]*Ibid.* 180; [5]*Jour. Amer. Med. Assoc.* 1928, i, 1936; [6]*Munch. med. Woch.* 1927, Aug. 26, 1454; [7]*Ann. of Surg.* 1927, Aug., 283; [8]*Ibid.* Sept., 321; [9]*Surg. Gynecol. and Obst.* 1927, Sept., 332.

STOMACH, SURGICAL AFFECTIONS OF.

(See also GASTRIC AND DUODENAL ULCER; STOMACH, CANCER OF.)

A. Rendle Short, M.D., F.R.C.S.

Hypertrophic Stenosis of the Pylorus in Infants.—At a discussion of French surgeons[1] on this subject, in which five took part, the principal points brought out were as follows: Martin operated on twenty-one cases and saved all but three. A favourable prognosis depends on opening the abdomen within eight or ten days of the onset. If the infant has lost one-third of its weight the outlook is unpromising. The differentiation between spasm and stenosis is difficult, and cases that are cured by medical treatment are false stenoses.

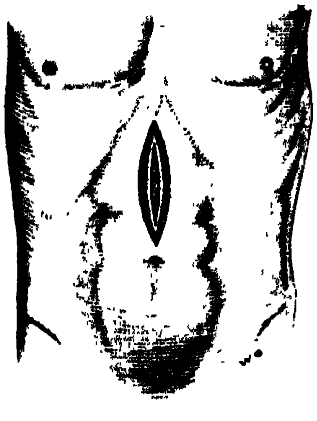


Fig. 81.—The relative positions of the midline incision and the stab wound.

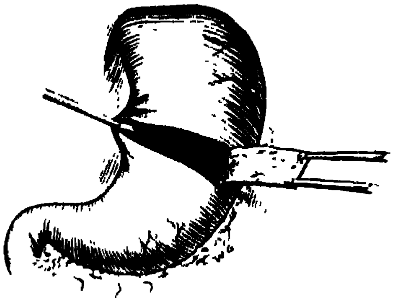


Fig. 82.—The clamps grasp the entire thickness of the cut edge of the stomach wall, and the flap has been completely raised.

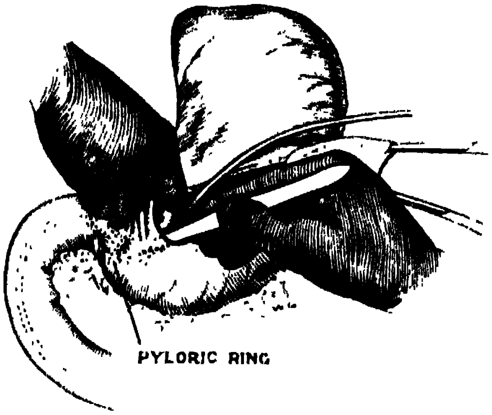


Fig. 83.—Inserting the feeding-tube through the pylorus into the duodenum.

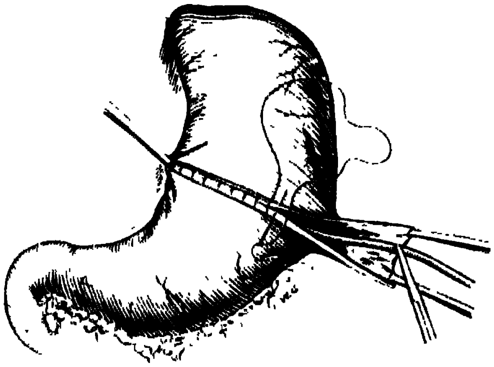


Fig. 84.—The feeding-tube has been clamped to the free end of the flap and suture of the mucous layer partially completed.

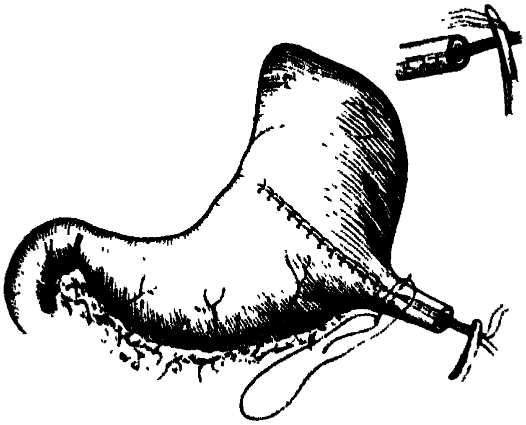


Fig. 85.—Suture of the mucous layer has been completed, the ends of the suture cut long, and the tube secured to them by a clamp. Suture of the serosa is partially complete.

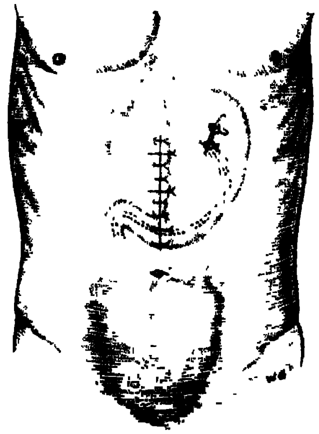


Fig. 86.—The relative positions of the stomach, the gooseneck tube, and the stoma.

(*Figs.* 81–86 *re-drawn from 'Surgery, Gynecology and Obstetrics'.*)

The X rays show in stenosis that the stomach empties by a succession of jets; in spasm by a single jet. Several French surgeons operate without an anæsthetic, with a nipple in the child's mouth. The usual procedure is akin to Rammstedt's operation. (*See also* PYLORUS, CONGENITAL STENOSIS OF.)

Technique of Gastrostomy.—D. Quick and H. E. Martin[2] discuss the principal types of operative procedure, and object to most of them because they leak, and if the tube is left out for any length of time the orifice is likely to close up. After a gastrostomy for cancer of the œsophagus it is not uncommon for some power of swallowing to be retained or to return, so this last difficulty is a real one. They recommend a modification of Janeway's method (*Figs.* 81-86). The main virtue lies in the fact that there is a long tubular track created, lined by mucosa instead of by granulation tissue. It will remain permeable even if it has not been used for months, and it does not leak if it is not made too large. The tubular track is obtained by raising a U-shaped strip from the anterior wall of the stomach, with the base to the greater curvature. The aperture is then closed up, except just at the base of the flap. A rubber tube is inserted through the opening and into the duodenum. The sides of the flap are then sewn rather tightly around the tube, and it is brought out through a stab-wound and fixed by a stitch or two to the anterior rectus sheath and to the skin. The tube is shortened little by little during succeeding days, and after a week dispensed with altogether except for feeding. The tube should not be larger than a No. 12 French catheter.

Gastroptosis.—B. Martin,[3] of Berlin, advocates **Sleeve-resection** for large dropped asthenic stomachs, and presents a study of four cases in young women operated on at least two years previously. Good results are claimed; the patients are in full work. The operation is not a severe one.

REFERENCES.—[1]*Bull. et Mém. Soc. nat. de Chir.* 1927, liii. 324; [2]*Surg. Gynecol. and Obst.* 1928, March, 426; [3]*Zentralb. f. Chir.* 1927, Aug. 6, 2003.

STOMACH, ULCER OF. (*See* GASTRIC AND DUODENAL ULCER.)

STREPTOCOCCAL INFECTIONS OF THE SKIN. (*See* SKIN, STREPTOCOCCAL INFECTIONS OF.)

SUPRARENALS, THE.

W. Langdon Brown, M.D., F.R.C.P.

Treatment of Addison's Disease with Suprarenal Extract. H. E. Marsh[1] reports two cases which clinically conformed to Addison's disease in which improvement followed treatment with 15 gr. of suprarenal extract a day. Both patients are still living, and both had recurrences whenever the treatment was discontinued. He refers to the possibility of simple atrophy or fibrosis.

The reviewer has had two cases of this sort, but it remains true that treatment by suprarenal extract seldom has much effect in Addison's disease. Byrom Bramwell has suggested that it might be possible to distinguish caseous changes in the adrenals from those of simple atrophy by X-ray examination, since such caseous nodules show up quite clearly in the lung. Although in the abdomen there would not be the same contrast between the surrounding tissue and the caseous matter as in the lung, it is nevertheless worth while to put this method of diagnosis to the test. Marsh appears to think that Addison confused the anæmia and the adrenal disease which go by his name. But Addison clearly stated that "it was while seeking in vain to throw some additional light upon this form of anæmia that I stumbled upon the curious facts which it is my more immediate object to make known to the profession". From the first he recognized that they were different entities.

REFERENCE.—[1]*Amer. Jour. Med. Sci.* 1928, June, 769.

SURGERY IN THE EAST. *A. Dickson Wright, M.S., F.R.C.S., D.T.M.& H.*

The major part of the surgical conditions found in the tropics are the same as those encountered in the temperate zones; thus in a native hospital in the East an analysis of the operations performed showed that 83 per cent were for conditions not peculiar to the tropics. Surgery in the tropics can therefore be considered in two sections: (I) *Peculiarities in common surgical conditions as found in the tropics*; (II) *The surgery of tropical diseases.* A further section is devoted to (III) *Ear, nose, and throat conditions in the tropics.*

I. PECULIARITIES IN COMMON SURGICAL CONDITIONS AS FOUND IN THE TROPICS.

CANCER.

The study of the incidence of cancer as regards special organs and the discrepancies between native races and those of European extraction is extremely interesting and may be explained etiologically one day. Europeans do not seem to show any variation as a result of residence in the tropics; rodent ulcers are very common, and the usual organs—tongue, breast, stomach, uterus, and rectum—are involved in normal proportions. The increase in bronchial and alveolar carcinoma of the lung is manifest in the tropics among Europeans; cases often occur long before the 'cancer age' is reached. The Asiatic seems to escape cancers of tongue, lung, rectum, and breast. The freedom of Cingalese women from breast cancer is well known. Negro women, however, seem to have a high incidence of very virulent breast carcinomata. In this relation the common occurrence of *Demodex* in their sebaceous follicles is of interest and has been cited as the cause. Rectal cancers only seem to be common in schistosomiasis areas. Elsewhere in the tropics they are rare, which is surprising in view of the ulcerative conditions of the colon which are so common. Rectal amœbiasis is not a precancerous condition.

The cancers that are seen frequently in the tropics are:

1. Cancers due to Faulty Hygienic Habits peculiar to Asiatics.

a. 'Sireh', 'betel', or 'pan' cancers, which are extremely common. Thus in 1924 in Ceylon 45 per cent of deaths from cancer were due to growths of the cheeks, jaws, and lips. This squamous-celled carcinoma appears in the sulcus between the lower jaw and the cheek where the quid of gambier, areca nut, lime, and sireh-vine leaf is stored; the carcinogenetic number of these four has not yet been decided. These cancers are highly malignant, quickly perforate the cheek and pass beyond operative control.

b. 'Kangri' cancers of Kashmir and Tibet.

c. Œsophageal cancers of the Chinese, which are very common. The consumption of overheated rice by the head of the family has been cited as the cause.

d. Penile cancers, excessively common in non-Mohammedan races. The balanolith, almost a monopoly of China, points to the hygienic conditions prevailing.

2. Primary Hepatic Carcinoma is common in certain tropical countries, e.g., Malaya.[1] It is usual to find the growth in a previously cirrhotic liver, indicating a common irritative agent. Another possible etiological factor might be the prevalence of biliary helminthiasis, ascariasis, clonorchiasis, dicrocœliasis, and schistosomiasis japonicum. It is of great interest that the liver, which suffers so much from other diseases in the tropics, should also so frequently be the seat of malignancy.

3. Cancers of the Nasal and Nasopharyngeal Mucosa.—These growths have an anomalous histology, being sometimes called sarcoma, sometimes carcinoma, and sometimes 'carcinoma sarcomatodes'. The title 'epithelioma terebrans' is the best, and denotes the extraordinary faculty of this growth for creeping over the nasal cavities and extending into all the foramina in the base of the skull. There is little doubt that it is epitheliomatous in character, as cervical adenopathy is early present in the disease.

A very characteristic syndrome is produced: (*a*) Unilateral obstruction, epistaxis, and discharge, later becoming bilateral; (*b*) Empyema or involvement of the antrum by growth, with cacosmia; (*c*) Headaches, at first of the nasal type and later from cerebral compression; (*d*) Deafness, at first on the affected side, from invasion of the Eustachian orifices; (*e*) Exophthalmos, squints, and blindness from invasion of the sphenoidal fissure; (*f*) Lastly, signs of cerebral compression from invasion of the foramina of the optic nerve, cribriform plate, etc. The starting-point is most usually the inferior turbinate at its posterior end, as a malignant polypus.

The prevalence of this disease is indicated by the fact that in Hong Kong in 1924, 20 per cent of the reported cancers were nasal or nasopharyngeal. These figures prevail in emigrant Chinese populations such as occur in Malaya, where the incidence is as high, if not higher.

4. **Schistosomiasis Cancers of the Bladder and Rectum** are common in infected areas. The bladder seems to be involved three times as often as the rectum. In Iraq 28 per cent of cancers are vesical.

Abdominal Surgery.

The Acute Abdomen presents more problems of diagnosis than it does elsewhere, for the following reasons: (1) One has to bear in mind the abdominal catastrophes peculiar to the tropics: (2) Anamnesis is impossible in the Oriental lower classes: (3) The natural stoicism of many Oriental races leads one to underestimate the gravity of the case: (4) Opium is purchasable anywhere and is used liberally for the relief of pain, and so one is always dealing with the morphinized patient.

Intestinal Obstruction. We find in addition to the common causes: (1) Round-worm obstruction from a knot of ascarides; (2) Post-dysenteric strictures, which are quite common, and follow all types of dysentery bacterial, amœbic, balantidial, and those due to schistosomiasis infections. In these cases colostomy and lateral anastomosis are taboo. Peritonitis will surely result if the diseased bowel is interfered with. The correct treatment is a low enterostomy and treatment of the colitis *secundum artem*.

Peritonitis. The picture is generally completely altered in the East by the big doses of opium which are consumed in every painful illness: quite a large proportion of cases of virulent peritonitis even in European subjects show no rigidity, only moderate tenderness and free fluid. For these reasons delay in diagnosis is common, but would not be so if the pulse-rate and the absence of abdominal respiration were more carefully observed.

Perforation of a Typhoid Ulcer provides a very large proportion of the cases of peritonitis, and it is the rule in these cases that the rigidity does not correspond with the degree of peritonitis on account of the feeble condition of the patient. Operation is always resorted to, but the recovery-rate is almost negligible.

The technique used by the writer has been as follows: Anæsthesia—gas and oxygen if possible; never spinal anæsthesia, as this (1) decreases the already dangerously low blood-pressure, (2) increases the already severe toxæmia on account of splanchnic engorgement, (3) sets up violent peristalsis, with flooding of the peritoneal cavity with bowel contents. The pus is then evacuated through the thinnest portion of the abdominal wall—namely, the anterior rectal wall - through a small incision made through a speculum, the nozzle of a suction pump is inserted, and the exudate evacuated rapidly. A McBurney incision is made, the perforation sutured, and any threatening perforations are infolded; this wound is then closed. A small drainage tube is passed through the anal sphincter into the opening previously made for drainage. The patient is returned to bed in Fowler's position, and stimulating treatment is instituted. This treatment gives the minimum of handling of the intestines and early adhesions are not disturbed; this is very important, as one often finds in these cases a large pelvic collection of offensive pus separated by early flimsy adhesions from a large sterile reactionary exudate in the upper portion of the abdomen, and if these are kept separate the prognosis is greatly improved.

Perforations of Amœbic and Bacillary Ulcers of the colon are not infrequent. When the ulcer is in the cæcum a retrocæcal abscess may form; or, if adhesions are present, as is often the case in chronic dysentery, a localized intraperitoneal abscess is formed. This should be drained rectally if possible; if not, the method recommended by Deaver should be employed. The incision is carried down to the extraperitoneal layer, and the line of cleavage deep to the transversalis fascia opened up; the abscess is palpated until the place is found where it is nearest the surface; here the peritoneum is incised and drainage instituted through a stab.

Rupture of a Liver Abscess into the peritoneal cavity gives a clinical picture of acute peritonitis; it resembles that of rupture of a diseased gall-bladder. The contents of the abscess, like bile, are not very irritant, and so the 'boarding' seen in perforated peptic ulcer is not encountered. The best treatment is evacuation of the pus in the peritoneal cavity by suction, and cleaning out the abscess cavity in the liver, which if small can be closed with a few sutures. If the pus is secondarily infected with *B. coli* or the abscess in the liver is very large, drainage for 24 to 48 hours is indicated. Post-operative treatment is instituted at once with the amœbic triad --**Emetine, Yatren,** and **Stovarsol.**

Filarial Abscess of the Abdomen is very grave. It generally starts in the retroperitoneal lymphatics, occasionally in the mesentery, and ruptures into the peritoneal cavity, causing a fatal streptococcal or staphylococcal peritonitis. Drainage by the extraperitoneal route as previously described should be adopted, but if this is impossible the tube which traverses the peritoneal cavity should be shut off by stitching omentum and small intestine closely round it so as to anticipate the formation of a track.

Perforation of the Bowel by a Round-worm has often been recorded in the tropics, and the writer has seen a case in which a round-worm had perforated the gut in one place and was re-entering another loop of gut. Extravasation of bowel contents had taken place. The worm may perforate healthy bowel or the floor of an ulcer of the bowel wall. In perforating injuries of the intestines it is quite usual to find ascarides free in the peritoneal cavity, and they should be searched for in all such cases.

Perforating Injuries of the Intestines are extremely common in the tropics. Stabbing injuries are generally inflicted upon the abdomen, and frequently penetrate the pleural cavity in addition. Free exposure and closure of all perforations is the only treatment, but the mortality is extremely high, punctures of the colon in the retroperitoneal area or a severed lumbar vein or artery being overlooked after closing perhaps a dozen bowel perforations satisfactorily.

Hæmorrhages into the Peritoneal Cavity are more common in the tropics than elsewhere owing to the frequency of rupture of enlarged friable spleens from trauma and to the high incidence of ectopic gestations. Ballance's sign —fixed dullness in the left and shifting dullness in the right flank—is of great value in the diagnosis of splenic hæmorrhage. Exploratory puncture of the peritoneal cavity is justified in unconscious or shocked patients to make a certain diagnosis. The replacement of the lost blood in the circulation is not advisable in cases of malarious spleens, as it may provoke a severe malarial attack. It is best in these cases merely to leave the blood in the peritoneal cavity to be absorbed, and to rely upon intravenous gum or saline to tide over the crisis.

Delayed Rupture of the Spleen is common. An injury causes a hæmorrhage into the substance of the spleen, but the thickened capsule reinforced by adhesions does not give way for several days, when furious bleeding may occur. During the interval the spleen forms a cystic swelling which enlarges daily. One of the most important points in the technique of splenectomy is to spare the tail of the pancreas; any trauma here will result in an area of suppurative or hæmorrhagic pancreatitis or peritonitis. Hyperpyrexia is a troublesome post-operative complication, and often but not always is due to malaria.

Prophylactic Splenectomy is only justified when at laparotomy the spleen is free from firm adhesions; a prohibitive death-rate occurs if firmly adherent spleens are removed. It has not been proved that splenectomy cures chronic malaria, but the removal of a large spleen will often make manual labour possible and remove the constant menace of rupture.

Appendicitis is a comparatively rare disease among Asiatics: the reason for this is undoubtedly mechanical and due to the fixity of the cæcum in the coloured races, in whom it is almost invariably impossible to deliver the cæcum from the abdomen and ptosis is never seen; in Java[2] in 1924, of 126,847 admissions to 171 hospitals there were only 164 cases of appendicitis. In Europeans in the tropics, appendicitis is extremely common and frequently fatal; the explanation of the high incidence is possibly to be found in the dietetic theory. Tinned foods form a large item in the diet of Europeans in the tropics, and food-poisoning is extremely common. Adding weight to this theory is the observation that many cases of acute appendicitis seen in the tropics are associated with prodromal diarrhœa rather than with constipation, evidently an acute enteritis and colitis spreading to the appendicular mucosa. The ubiquitous round-worm is sometimes cut across as it lies inside the appendix during the operation of appendicectomy. The whip-worm does not seem to cause appendicitis, but there is little doubt that the thread-worm does.

Gall-bladder Affections are extremely common in the tropics, and resemble greatly the disease as seen elsewhere, with the following exceptions:

1. *Biliary helminthiasis* is common, and often only diagnosed post mortem. In the writer's experience round-worms were encountered in 8 per cent of operations performed on the biliary passages, and on one occasion *Clonorchis sinensis*. When the worm or worms are in the common bile-duct septic cholangitis is the rule, but when in the gall-bladder the prognosis is good. Frequently the worms are found dead, or occasionally forming the nucleus of a calculus (Pasley).

2. *Hepatic lithiasis* is frequently encountered: a bile 'mud' fills all the bile capillaries up to Glisson's capsule.

3. *Primary acute cholecystitis* without stones seems to be unusually frequent, and may result in gangrene or 'pin-point' perforation. The explanation of this is obvious: almost without exception the pathogenic bacteria affecting the colon have also a predilection for the mucosa of the gall-bladder.[3] The *Amœba histolytica* is also capable of causing cholecystitis.

Gastric and Duodenal Ulcers are extremely common among both Europeans and Asiatics, the reason undoubtedly being the unsuitable dietary of the tropics and the large consumption of tinned foods. The incidence among vegetarian sects and Mohammedans with a restricted meat diet seems to be appreciably less; in addition many of these take alkali by the mouth in quite large quantities in the form of the lime which is a constituent of the betel mixture; the areca nut, another constituent, is undoubtedly a valuable vermifuge. The unbelievable amount of capsicum consumed by natives and Europeans in the tropics does not seem to have any injurious effect upon the stomach.

Hernia. - Femoral and ventral herniæ are practically unknown among Asiatics. Inguinal hernia is very common, and the later stages of strangulation are frequently seen. It has been the writer's custom in very late toxæmic cases to create a fæcal fistula in the scrotum with the cautery knife and to make a high enterostomy under local anæsthesia.

ORTHOPÆDICS.

Fractures form a special problem; the lower-class Asiatic is not very amenable to discipline, and most impatient of restraint. Carefully applied splints are discarded overnight, plaster cases removed by willing friends, and surreptitious visits made to the local market long before callus is consolidated. In addition splints and dressings left on for any length of time become the home of families of bed-bugs and colonies of ants, and moreover splint sores form with astonishing rapidity. On account of this difficulty in fixing the fracture securely operation is often resorted to. The writer has employed intramedullary pegs for long bones, and the use of the Thomas walking caliper as soon as the wound has healed. Fractures of the tibia and fibula have been treated by Delbet's method. Any ambulatory treatment is very acceptable to the Asiatic. Light moulded plaster splints or cases should be used instead of wooden splints whenever possible.

Derangements of the Semilunar Cartilage never seem to occur in the Asiatic footballer.

Orthopædic Operations. The moist and germ-laden atmosphere of the tropics does not seem to interfere with wound union, secondary infections of sinuses are no more common than in Europe, and the surgeon can operate on joints and undertake extensive bone-grafting operations just as he would in colder climates, provided he can train his theatre staff up to an absolutely rigid aseptic technique. For various reasons this is difficult to accomplish, and the minor details have to be kept under the surgeon's constant supervision or a serious breakdown will occur in the aseptic chain.

ANÆSTHESIA.

Anæsthesia in the tropics is an especially difficult problem. All anæsthetics seem to have their potency reduced by 50 per cent, so that open chloroform has to be used with the same liberality as ether is used in England. Open ether is impossible, and closed ether difficult. In addition, quite a large proportion of the subjects are very 'hard-headed' as a result of steady alcoholism. The tendency everywhere is to drift back to chloroform, with its appalling death-rate. The surgeon in the tropics soon becomes an expert at resuscitation. The following has been the routine of the writer: First, artificial respiration by short jerky compressions of the chest, with pure oxygen: after two minutes of this, if there is no pulse, the cerebral circulation must be maintained at all costs by opening the external jugular vein and squeezing the left ventricle through an abdominal incision. The next step is to aspirate the right ventricle and inject 5 c.c. of 1 5000 adrenalin chloride. This method succeeds except in those hopeless cases occurring after long anæsthesia and primary stoppage of the heart without cessation of respiration. A satisfactory safe routine anæsthetic to replace open chloroform is yet to be discovered for work in tropical temperatures. For this reason local anæsthesia is very popular in the East. Spinal novocain, local anæsthesia, and splanchnic anæsthesia, generally with scopolamine in addition, are all very useful.

Sufferers from *sprue* are especially bad subjects for general anæsthesia: post-anæsthetic vomiting is most difficult to control and may be actually fatal. None but absolutely essential operations should be performed on sprue patients in the tropics.

TETANUS.

Tetanus is common in the tropics, but there are two special types which seem to be peculiar:

1. Tetanus occurring without any external wound. This is frequently seen, and the only explanation offered is that the infection occurs through a dysenteric ulcer. The *B. tetani* is a frequent inhabitant of the intestine of the Chinese.

2. Tetanus following intramuscular quinine injections. Two possible explanations are offered: (*a*) That the spores are introduced with the quinine and find an excellent culture medium in necrosed muscle. (*b*) That the spores circulate in the blood, having been released from the scar of an old infected wound or having entered the circulation through an intestinal ulcer; they then find an excellent anaerobic culture medium in the area of quinine necrosis.

The writer has also seen gas gangrene following a contusion without external wound.

II. THE SURGERY OF TROPICAL DISEASES.

ULCERS IN THE TROPICS.

Ulcus Tropicus is one of the commonest and most disabling diseases of the tropics. It involves prolonged hospital treatment, has a high mortality, and often healing results in serious deformity. In the tropics it takes the place of the varicose ulcer of temperate climates, which is rarely seen in the tropics. Infection takes place through a small abrasion, insect or leech bite, guinea-worm puncture, the ground itch caused by ankylostome larvæ, or poisonous fish stings, e.g., *Plotosus anguillaris*. The further course of the disease then depends entirely upon the resistance of the patient. In the healthy Asiatic and European a red induration develops, in the centre of which a slough appears which slowly separates and leaves behind a flat oval shallow ulcer with uneven granulations coated with fibrinous exudate, which slowly heals in an irregular manner, the new epithelium growing in more rapidly from certain portions of the margin than others. In the debilitated native a different story is told. He is probably suffering at the same time from one or more of the following diseases: tropical anæmia, ankylostomiasis, malarial cachexia, ascariasis, syphilis, beri-beri, chronic dysentery, or hepatic cirrhosis. In such a subject the destructive process goes through the tissues like wild-fire; skin, fat, fascia, muscle, tendon, and even bone and periosteum fall before it, and huge gangrenous masses and sequestra are formed. At the same time there are marked constitutional symptoms, pyrexia, rapid feeble pulse, and rapid emaciation. A constant feature in serious cases is a dry condition of the skin resembling *ichthyosis*. The condition of the patient and the degree of toxæmia are best estimated by the blood-pressure: 60 to 80 mm. Hg. is common in severe cases.

The legs and feet are most usually involved, although typical infections of the hand and arm and scrotum are seen. When the foot and hand are affected, there is a frequent tendency to fungation (ulcus sarcomatodes). The causative organism is still unknown. The *Spiroschaudinia Vincenti*, in symbiosis with *B. fusiformis*, is almost always found. Gellonesi[1] has differentiated three types of spirochæte (although the disease does not react to arsenical treatment so well as Vincent's angina). *B. pyocyaneus*[5] has been incriminated, but the discharge from the ulcer, which is generally not profuse and not markedly purulent, does not develop the green colour on exposure to air characteristic of infections with this organism.

TREATMENT. -If the leg is hopelessly disorganized, **Amputation** should be the only treatment ; there is a grave risk in these cases of carrying palliative treatment too far and allowing the patient to become so exhausted from pain and toxæmia that an amputation is certain to be fatal. **Blood Transfusions** are very valuable before and after amputation in desperate cases. When both legs are severely infected, as is often the case, amputation of the worst leg will sometimes give the patient sufficient strength to deal with the other infection. Irremedial deformity is another indication for amputation.

The routine treatment for ulcer should pursue the following lines :

1. *Constitutional.* Urine, stools, and blood should be examined without delay, and the appropriate treatment given for syphilis, malaria, dysentery, helminthiasis, and nephritis. Anæmia, always present, is treated by injections of '**Ferrarin**' or a similar preparation. The reflexes and heart should be examined for beri-beri, and appropriate diet given together with subcutaneous injections of concentrated **Vitamin** if obtainable. Ichthyosis is nearly always present, and **Thyroid Extract,** gr. v, o.m., should be administered. **Alcohol** is a valuable stimulant.

2. Every seven days **Sulpharsenol** or similar preparation is given in increasing doses. This is extremely valuable in treatment for three reasons : (*a*) Syphilis is often associated ; (*b*) If the ulcer is spirochætal it may do some good ; (*c*) It is a valuable tonic and hæmatinic.

3. *Local.* This is divided into three stages according to the state of the ulcer : (*a*) When the ulcer is full of sloughs, offensive, and very dirty, there is no treatment like Pfannenstiel's **Nascent Iodine** method. Pot. iod., gr. xv, t.d.s., is exhibited and the wound dressed with hydrogen peroxide dressings at hourly intervals. If large sloughs are present it is not sufficient to place dressings on top of them ; the hydrogen peroxide must then be injected deep into the gangrenous tissue. By this method the sloughs are rapidly disintegrated, the ulcer clears up, and the toxæmia disappears. (*b*) **Hexyl Resorcinol** dressings are applied when the sloughs are separated and the ulcer is indolent. The solution used is : Hexyl resorcinol gr. v, Glycerin pur., ℥iij, Aqua dest. ad ℥x ; this has a very low surface tension and is a most efficient dressing. (*c*) **Lotio Rubra** is used for seven days when the ulcer starts to heal. The next stage is (*d*) **Skin Grafting** done by the Thiersch method ; the grafts are covered with **Porowax** and 10 per cent saline dressings, the latter being changed every three hours and the porowax removed after fourteen days. (*e*) **Alcohol Injections** into,[6] or stripping of the sheath of, the common femoral artery, and 15 per cent alcohol injections into the sciatic nerve, are tried in stubborn cases to improve the vascular supply of the ulcer, but they are not usually very effective in intractable cases.

Innumerable other remedies have been recommended. **Stovarsol** powder or paste, **Salvarsan** solution, 3 per cent **Methylene Blue,** and **Desitin**[7] are of value. **Copper Ionization** is recommended.

Ulcer due to Guinea-worm is common in India and West Africa, and causes a great deal of disability as it is so slow to heal. The usual situation is at the ankle or the knee, and the loculated abscess caused by the death of the worm when it ruptures or is incised forms an ulcer which is very slow in healing. The reason for this is inadequate drainage of all the pockets. A rapid healing will be obtained if the following method of treatment is adopted : (1) Crucial incisions are made extending well beyond all indurated tissue, and so placed that resultant cicatrization will not cause contracture. This is important, because contractures are a frequent sequel, owing to the predilection of the worm for the vicinity of joints. (2) The four flaps thus marked out are undermined freely into healthy surrounding tissue and the flaps turned back. Necrotic tissue is removed with a sharp spoon. This free undermining ensures that all the ramifications of the abscess are freely opened. (3) The cavity is packed with **Hygroscopic Paste** (anhydrous magnesium sulphate and glycerin). (4) When the cavity is clean the flaps are replaced and **Zinc Lotion** is used. By this radical method healing is usual within fourteen days, instead of the many months taken when drainage is inadequate.

Calcified guinea-worms sometimes cause trouble from local irritation affecting adjoining joints or nerves, and have to be excised.

Other Ulcerative Conditions more or less peculiar to the tropics are:

1. *Cutaneous Leishmaniasis.* In some cases excision is a good treatment and shortens the illness. **Tartar Emetic** by the intravenous route is the specific.

2. *'Ground Itch.'*—This is produced by the entry of ankylostoma and strongylus larvæ through the skin of the feet; secondary infection of the blisters produces troublesome ulcers.

3. *Amœbic Ulcers.* (*See* AMŒBIASIS, *below*.)

4. *Mycetomas and Dermal Mycosis.* The mycetomas are roughly of two categories, the yellow and the black, named according to the colour of the granules in the discharge. Clinically the yellow form is the more severe and calls for free removal. In the cases of infection with the black fungus more conservative methods, such as local excision and iodine medication, may be employed instead of amputation. The red mycetoma is rare and intermediate in severity. The 'mossy foot' of the Amazon is probably a form of elephantiasis, and the treatment is amputation.

Dermal mycoses are common in some parts of the tropics and rare in others. Blastomycosis, sporotrichosis, acladiosis, etc., can all produce intractable ulceration.

5. *Granuloma Venereum.* This condition is on the increase. The etiology is still obscure. Various bacteria are incriminated, as are the special Donovan bodies found in sections of the ulcers. The sheet anchor is still **Antimony**; as much as a total dosage of 180 gr. may be necessary to effect a cure. Local excisions can sometimes be performed. **Von Heyden 471** and **Thyroid** are recommended.[8] A 1 per cent **Tartar Emetic Ointment** applied for two hours daily is valuable. The writer has found **Diathermy Coagulation** of great value. **Souttar's Steam Cautery** should also be very useful.

6. *'Veldt Sore' and 'Barcoo' Rot.* Ulcerative conditions probably due to the Klebs-Loeffler bacillus. Dressings of **Antidiphtheritic Serum** are very valuable. The scars are very disfiguring in the case of 'barcoo' rot, as the ulcers occur on the hands and leave pigmented areas.

AMŒBIASIS.

1. **Intestinal.**—Surgical treatment here is confined to appendicostomy or enterostomy in very resistant cases. A very thorough **Yatren** lavage treatment can then be given by this means, the colon being free of contents. Occasionally perforations or strictures will call for emergency surgery.

2. **Hepatic.**—The **Aspiration** and **Emetine** treatment is everywhere gaining ground. If the liver does not diminish in size and the leucocyte count decrease, multiple or loculated abscess is probable, and operation should be undertaken before the patient loses too much ground. Secondary *B. coli* infection of the abscess also necessitates drainage.

3. **Urinary.**—More and more cases of stubborn cystitis in the tropics are found to be amœbic in origin.[9] **Emetine** effects a dramatic cure.

4. **Dermal.**—Three types are distinguished: (*a*) Porodermie amibienne,[10] a condition of minute punched-out ulcers of the skin; (*b*) Large ulcers, generally on the back, resulting from amœbic abscess, which respond well to **Emetine** injections and **Yatren** dressings; (*c*) Infection of skin round a drainage sinus from liver or cæcum, or an anal fistula in a case of amœbic proctitis.

5. **Amœbic Iridocyclitis** is now more or less established as a clinical entity.

FILARIASIS.

Elephantiasis.—

1. *Elephantiasis of Extremities.* Kondoleon's operation is still performed, with the trephining of the long bones and insertion of fascia lata drains into the apertures. A few successes occur but many failures.

2. *Elephantiasis of Scrotum.* The fault in most operations described for this condition is that too much attention is paid to providing flaps to cover the testicles and penis, with the result that elephantoid skin is included in the flaps, the cords are injured, and the penis is covered with a hairy pubic skin-flap. The writer's method is:

a. To cut down on the spermatic cords in the inguinal region, and follow out the cord to the hydrocele which is nearly always present. The hydrocele is then dealt with, and a hæmostatic suture used to encircle the cut edges of the peritoneal coat. Each testicle and cord is then wrapped in flavine gauze and anchored out of the way.

b. The entrance of the tunnel leading to the penis is encircled by an incision and the penis liberated by dissection. The lining of this tunnel is perfectly good preputial skin, which, turned inside out, forms an excellent non-elephantoid covering for the penis later on. The penis is then wrapped up in flavine gauze and anchored out of the way.

c. All important structures being out of the way, the elephantoid tissue is cut cleanly away in its entirety. The only precaution necessary is to avoid the rectum, which may bulge forward from dragging on the scrotum. The appearance of yellow ischiorectal fat is the warning sign. The tourniquet is useless and only in the way; hæmorrhage is easily dealt with.

d. The penis is now covered with preputial skin, which is stitched to the wound in the pubic region.

e. The flaps to cover the testicles are raised by undermining down to the adductor longus, and stitched in the middle line. If flaps cannot be manufactured it is not of great moment; the testicles and cords are stitched in position, the skin-flaps are approximated as far as possible, and the testicles and raw surface are covered with 'porowax' dressing. After fourteen days, when the wound is covered with healthy granulations, Thiersch grafts are applied.

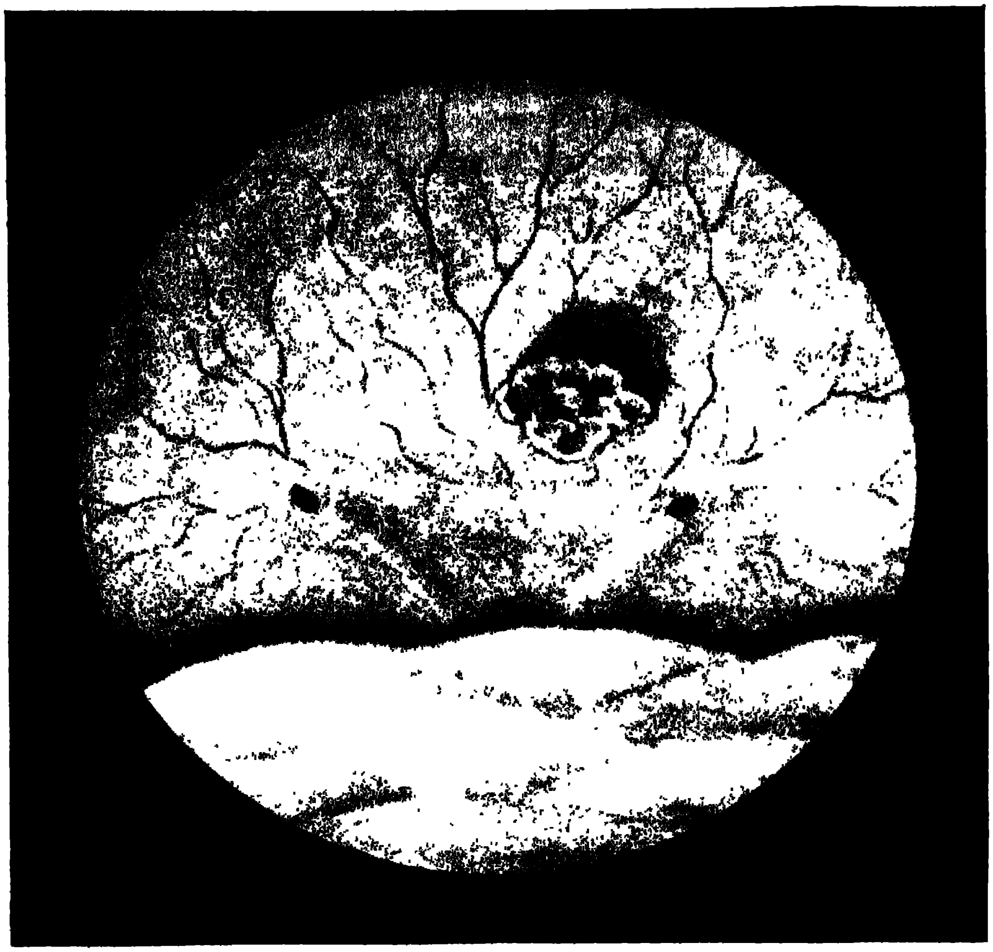
f. Absolute hæmostasis must be secured.

Lymph Scrotum.—It is sometimes stated that operation is not indicated in this condition because of the possibility of lymphorrhagia from the wound margins. This does not occur in practice provided the incisions are made outside the zone of dilated lymphatics in good healthy skin, in which case primary union is the rule and the sufferer is relieved of a very disabling condition. In this complication of filariasis there is no element of infection (elephantoid fever), and lymphangitis does not occur. The condition is troublesome because the dilated superficial lymphatics frequently rupture, a troublesome discharge of lymph ensues, and the scrotal skin becomes eczematous.

Filarial Orchitis.—The frequent attacks of fever and excruciating pain may induce the sufferer to plead for operative interference. Castration with

PLATE LVII

LYMPHURIA



The coagulum on the floor of the bladder is coloured blue as the result of administration of methylene blue.

division of the cord high up relieves the condition at once, and is worth doing in bad cases.

Varicose Lymph-glands are not disturbed as a rule unless they form pendulous tumours and become subject to attacks of inflammation. Excision is almost always followed by leakage of lymph from the wound, which dries up after a certain time. O'Connor[11] recommends direct surgical attack upon the adult worm if its position is declared by recurrent inflammatory attacks in one place.

Funiculitis is frequently stated to be one of the complications of filariasis, but this has yet to be proved. The recurrent type which occurs in association with orchitis is undoubtedly filarial in origin. On the other hand, the fulminating streptococcal infection of the cord so frequently seen in the tropics does not seem to have any connection with filariasis. The disease usually starts with a rigor and acute pain in the inguinal region; the cord is exquisitely tender and swollen, and in the iliac fossa is felt a tender tumour due to inflammatory exudate in the retroperitoneal space. Immediate operation is indicated, and the inflamed area is laid open with the utmost freedom. As a rule a serofibrinous exudate is found, as the cases are not usually of sufficient duration for pus to have formed. After drainage the discharge quickly becomes purulent, and pockets of pus form in the scrotum and in the abdominal subcutaneous tissue, and these should be ruthlessly followed up. The mortality is extremely high, and can only be kept down by early and adequate operation. The infecting organism is usually a hæmolytic streptococcus, or rarely *Staphylococcus aureus* in the milder cases.

Lymphuria is a feature of filariasis in some infected areas and is unknown in others. Non-filarial lymphuria has also been described. When blood is admixed it is known as hæmatolymphuria; when soaps are found in addition the title of hæmatochyluria is used. Microfilariæ occur in the urine in about half of the cases. The onset of lymphuria is generally spontaneous. Sometimes, however, the complaint dates from parturition, some act of violent exercise, or an accident.

The symptoms are distressing, causing backache, lassitude, and neurasthenia, and attacks of clot retention. The loss of blood may be great and death from secondary anæmia may result. In these serious cases the condition present is probably a general lymphangiectasis with incompetence of the lymphatic valves, and the blood comes direct from the left subclavian vein. The writer has verified this at post-mortem, the thoracic duct at the point of junction with the subclavian admitting the little finger easily, and the retropleural and retroperitoneal lymphatics forming a huge varix containing venous blood.

In about three-fourths of the cases of lymphuria the leaking point is easily seen in the bladder, generally just above the bar of Mercier, and the lymphuria is easily checked by fulguration of this spot (*Plate LVII*). The remainder show the ureter on one side to be discharging turbid urine. The ureteral diathermy electrode is passed in these cases and is generally successful in effecting a cure. In a small number of cases there are numerous points of leakage. Both ureters have a blood-stained efflux, and the bladder shows many adherent tufts of fibrin marking ruptured lymphatics.

TROPICAL BUBO.

No great advance has occurred in the treatment of this intractable complaint. H. M. Hanschell[12] reports cures with **Aspiration** and **Protein Shock**, but the treatment does not seem to be always successful, and the old method of total **Excision** of the infected glands is still carried out in most places. The temperature chart is the most reliable guide to prognosis. If evening rises over 100° are registered, operation is almost certain to be required, and the glands will not resolve with protein shock or arsenical or antimonial medication. The points of importance in the technique of the operation of excision are :—

1. To excise the gland of Cloquet, the external iliac glands, and the superficial femoral glands if grossly infected. The external iliac glands form quite a large abdominal tumour when infected, sometimes mistaken for an appendix abscess.

2. If there is a bilateral infection, the operation of excision is not indicated, but the abscesses should be incised or the sinus enlarged if present, and the caseous glands scooped out with a spoon. By this method some lymph paths may be preserved and the very serious complication of penile elephantiasis is less likely to develop.

3. After operation twenty-four hours' drainage should be instituted. A weighted dressing should be placed over the undermined area to limit the large lymphatic collection and to induce the skin to adhere to the fascia lata. A lead-shot or mercury bag is the best dressing. Collections of lymph should be evacuated through a small cannula placed in the inner angle of the wound on subsequent days.

4. All red and inflamed skin should be ablated, as otherwise it will slough after operation and any chance of primary union will be lost. Primary healing only occurs in 5 per cent of cases, and those only the early ones. Partial primary union occurs in another 50 per cent. In other cases there is sloughing of the wound margins and a very tedious convalescence ensues. The best dressing for the wound in the groin and the primary sore is **Stovarsol** paste or powder.

Delbet describes a method of treatment. One of the glands is removed from the patient and placed in a desiccator. The dehydrated gland is emulsified and used as a **Vaccine.**

Specific skin reactions have been described by O. Fischer.[13] The abscess fluid from an undoubted case is sterilized and inoculated subcutaneously or intradermically. A rapidly induced reaction (erythema or vesicle formation) differentiates from a syphilitic or gonorrhœal bubo. Thus early operation can be undertaken before softening occurs, in which case primary union can be expected.

PLAGUE.

Cases of bubonic plague which recover generally require the services of a surgeon for the opening of the abscess which results from the broken-down glands. These abscesses are often very extensive and persistent. Sinuses often result, calling for a very free drainage of the loculated cavity. The writer has seen a sinus from an old femoral bubo extending via the inguinal glands, external iliac glands, and lumbar glands as far as the hilum of the kidney.

During epidemics it is quite justifiable to excise any suspicious primary vesicles, using a cautery or diathermy knife with great freedom, and afterwards instituting a course of intravenous **Colloidal Iodine.**

INJURIES RECEIVED FROM WILD ANIMALS, VENOMOUS SNAKES, ETC.

Crocodile Bites probably constitute the commonest type of injury seen. Anything more filthy than the oral cavity of the crocodile does not exist, and the wounds become seriously infected no matter how small the bite. The writer saw a case recently in which a man who was paddling in the sea received a bite on the dorsum of the foot from a baby crocodile not more than two feet long. He was not seen for forty-eight hours after the accident, when he was extremely ill with toxæmia and rigors, with the foot greatly swollen and the skin commencing to slough on the dorsum; the original injury was only a small puncture on the dorsum. Only by heroic measures was his life saved, and a large area of skin and all the extensor tendons sloughed away. No matter how trivial a crocodile bite may be, it should be excised and injections given of **Antisera** for *B. tetanus*, *B. Welchii*, and the streptococcus. Serious injuries involving the peritoneal and thoracic cavities always prove fatal. If amputation is necessary the open circular method should be employed.

Shark Bites are as a rule easily diagnosed from crocodile bites by the presence of shark's teeth in the wound and from the nature of the injury. They generally occur on the thigh, the muscles being torn away, often stripping the femur completely bare. There are no individual wounds as are made by the widely separated teeth of the crocodile. The shark's mouth is clean and the accident happens in salt water, so sepsis is not usual, and primary suture of the wound can as a rule be carried out with success. If amputation is required it is not necessary to do an open circular operation, but the flaps may be stitched up.

Tiger and Panther Bites are very septic, as these animals prefer their food when it is 'high'. The injuries from claw punctures require especial attention, as often they are very small and inconspicuous. The writer on one occasion saw a patient brought in dying from gas gangrene. The only visible injuries were four small punctures spread along a line about two feet in length on the outer side of the leg, where he had received a blow from a tiger's paw with the claws extended forty-eight hours before. A probe went two or three inches into the wounds and caused gas bubbles to appear. These punctured wounds should always be enlarged and dressed with hydrogen peroxide, and of course the usual prophylactic sera given.

Snake Bites.--The bites of viperines most often need surgical treatment, because they produce gangrene and severe cellulitis. Incisions, excisions, and amputations may be required. Hæmaturia is a frequent serious complication.

Scorpion and Centipede Bites sometimes produce tissue necrosis and call for excision.

Fish Stings are extremely painful, and sometimes require the removal of the broken-off sting in the depths of the puncture. It is well when incising for removal of the sting to make a fair-sized incision and dress the incision with strong permanganate solution. Fish stings sometimes become secondarily infected and produce an intractable ulcer. The stings generally occur on the foot, either on the sole from mud-fish (*Plotosus*) with a poisonous dorsal spine, or on the dorsum from sting-rays which have the sting on the tail and strike like a scorpion. Stings on the sole are generally the more painful, as the œdema is confined by the dense tissues; the pain may be so great as to produce collapse and require morphia.

Hornet Stings on the face may cause septicæmia and thrombosis of the cavernous sinus. It is well, when these complications threaten, to expose and tie the angular vein.

III. EAR, NOSE, AND THROAT CONDITIONS IN THE TROPICS.

EAR.

Mycotic Otitis Externa is extremely common, and is christened according to the locality in which it occurs--e.g., 'Hong Kong' or 'Singapore' ear. The causative fungi have never been classified, but green and black forms are particularly common. Frequent complications are secondary infection, furunculosis, post-auricular abscess, and perichondritis with resulting stenosis of the meatus. Treatment is extremely difficult owing to the swelling of the meatus. A good routine method is: (1) Reduce swelling by filling the ear with **Hygroscopic Paste**; (2) Paint the skin of the meatus with 20 per cent **Silver Nitrate** on alternate days; (3) When swelling and pain have subsided employ 20 per cent **Argyrol Ointment**; (4) In stubborn chronic cases a solution of **Chrysarobin,** 2 per cent in chloroform, is invaluable.

NOSE.

Nasal Catarrh and Vasomotor Rhinitis are extremely common. Thirty-five different plants and trees have been found to produce 'hay fever' in the tropics; the 'flame of the forest' and ansena trees, which are used so much for decorative purposes, are the chief offenders. Treatment is along the usual lines, and **Ephedrine** seems to be particularly efficacious.

Nasal Polypi are common. There is a definite type which is peculiar to the tropics due to infection with *Rhinosporidium seeberi*, previously regarded as a protozoon but now considered to be a fungus. The polypi usually grow from Kiesselbach's area on the septum or from the inferior turbinate, thus differing from the polypi of ethmoiditis. Treatment consists in **Excision, Tartar Emetic** injections, and the administration of **Iodides.** Access by Roúge's method is sometimes necessary when the disease is far advanced. *Rhinosporidium seeberi* is also known to infect the conjunctiva, external auditory meatus, and the urethral mucosa.

Nasal Myiasis is common in certain parts of the tropics. The usual larva is that of *Chrysomyia macellaris*, the 'screw worm'. A special form of nasal myiasis which has to be guarded against is the post-operative variety, occurring as a result of the fly entering the nares before the patient comes round from the anæsthetic. The writer has seen two cases of this, both due to Sarcophagidæ. Unconscious patients should always be kept under a mosquito net for this reason in localities where flies are numerous. The treatment usually recommended is inhalations of **Chloroform** or **Carbon Tetrachloride,** followed by syringing. When the frontal, ethmoidal, and maxillary sinuses are infected appropriate operative treatment is indicated, preferably by extranasal routes.

Leeches are often encountered in the nose, and cause blood-stained discharge and headache. Occasionally a marine worm of the class Polychæta gets into the nose in pearl-divers.

THROAT.

Throat conditions are very troublesome in tropical climates. The severe anginas are of three types: –

1. **Streptococcal Membranous Forms** with great enlargement of the cervical glands, which occasionally suppurate. Although the Klebs-Loeffler bacillus is not seen, palsies sometimes follow, and the good general rule of giving **Antidiphtheritic Serum** in *all* cases of membranous pharyngitis should be followed.

2. **Membranous Forms in which Vincent's Bacillus is Found.**—These are very common.

3. **Cases Associated with 'Septic' Rashes.** This type of case is frequently found on passenger liners proceeding to the tropics, so much so that the name of 'boat throat' has been coined for it. It is an exceptionally severe disease, and closely resembles scarlet fever. The throat is most intensely inflamed, pus is seen in the tonsillar crypts, and small patches of membrane on the pharyngeal mucosa. The skin rash is a pin-point erythema as a rule. The severity of this disease was brought home vividly during the past year when nine deaths occurred on a Dutch liner returning from the tropics and 70 per cent of the passengers were infected. On this boat there was a mild outbreak on the outward passage with one death, and on the return voyage the disease recurred in the Red Sea with increased virulence.

The writer once experienced an epidemic on an outward-bound vessel. The cases commenced on entering the Red Sea, and eventually more than half the passengers and crew were infected. After ten days cases ceased to occur. There were no deaths, but some of the cases were extremely ill. The epidemics seem to start during the transition from tropical to temperate climates, or vice versa. It seems as if the respiratory passages become infected with a new set of organisms at this time, and that immunity is not always acquired without considerable trouble. **Anti-scarlet-fever Serum** should be carried on all steamers, as it is a specific in this condition.

OPERATIONS.

Operations upon the throat and nasal passages should never be performed in the first three months after either arriving in the tropics or returning to a temperate climate, unless of absolute urgency. The mucous membranes of the nose and throat are teeming with organisms, and it takes time to establish local immunities in a new environment. The writer has seen many catastrophes where this rule has not been observed. In the cases of patients coming home for other operations it is wise to defer operation for the same time if respiratory complications are feared.

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SYMPATHECTOMY, PERIARTERIAL. (*See* PERIARTERIAL SYMPATHECTOMY ; TUBERCULOSIS OF BONES AND JOINTS ; VASCULAR SURGERY.)

SYPHILIS.

Col. L. W. Harrison, D.S.O.

EXPERIMENTAL SYPHILIS.

The syphilologist who relies only on clinical observation in human beings is in the dark respecting many problems of great importance to his work. The tendency of syphilis is to become latent, so far as outward manifestations are concerned ; the drama is long-drawn-out, for the most part played out behind the screen of unblemished skin and mucous membranes, with perhaps negative serum reactions, and its outcome becomes known to the observer in only a fraction of cases. The most diligent clinician can assess the value of a given treatment only after a number of years, and then, most of his original patients having disappeared, the evidence on which his judgement must be based is far from being complete. The result is a large degree of uncertainty and a wide diversity of opinion on the management of syphilis and on the criteria of cure. A closer insight into the natural course of syphilis and its behaviour under treatment is afforded by experiments on animals, and, although it would be a mistake to infer that the process in animals is exactly similar to that in man, the similarity in some animals is so close in respect of outward manifestations and of histological appearances that the syphilologist who ignores the hints afforded by animal experiments denies himself a guidance which would save him from many pitfalls. So far as they have gone at present, animal experiments seem to teach us, among other things, that syphilitic infection is latent from the first in a definite proportion of cases, so that non-appearance of a primary lesion is poor evidence of non-infection ; that lymph glands are the principal harbourers of the virus in latent syphilis, and that, in the absence of therapeutic measures, these remain virulent throughout the life of the animal; that the Neisserian dictum that a new infection with syphilis is impossible until the original infection has been eradicated is incorrect; that failure to reinfect does not prove failure to eradicate the original attack; that immunity resulting from interaction of parasite and tissues may be only partial and confined to the skin only; that immunity against reinfection with the strain of *Sp. pallida* originally employed may be ineffective against a heterologous strain; that many fever-producing agencies, though they ameliorate the processes of syphilis, do not eradicate it; and that, in treatment by such remedies as bismuth, it is necessary to use such a preparation in such a dosage as will result in a given minimal amount of the metal being incorporated in the tissues.

These examples of the teaching of experimental syphilis are reasons for devoting considerably more space than usual in the present number of the MEDICAL ANNUAL to this branch of syphilology.

Life Cycle of Sp. Pallida.—C. Levaditi, R. Schoen, and V. Sanchis-Bayarri[1] produce evidence that *Sp. pallida* is only one stage in the life cycle of the organism of syphilis. They point out that the glands of syphilitic rabbits may be virulent, as proved by inoculation into other rabbits, yet the most careful search may fail to disclose any *Sp. pallida*. In glands which they have examined histologically they distinguish a pre-spirochætal stage lasting for the first forty-five days after inoculation, and then, appearing quite suddenly, a stage in which the tissue becomes a typical syphiloma rich in *Sp. pallida*. In glands undergoing resolution they have seen *Sp. pallida*, enclosed in fibroblasts and free, in all stages from typical spirals to granules of almost ultra-microscopic size with an affinity for silver stains. They consider that this may explain the virulence of certain tissues in latent syphilis in spite of the absence of typical *Sp. pallida*. They suggest also that the granule forms may be more resistant to chemo-therapeutic agents than is the germ in its spirochætal vegetative form.

The Localization of Syphilitic Lesions in Inflamed Areas has been demonstrated experimentally by A. M. Chesney, T. B. Turner, and C. R. L. Halley.[2] These workers first produced wounds on the backs of rabbits, and after the wounds had healed, or whilst they were granulating, or whilst one wound on the same animal was granulating and one had healed, they inoculated the animals, some intratesticularly, some intravenously, with *Sp. pallida*. In each case syphilitic lesions developed in the scars, and the wounds usually conformed to the shape of these, no other lesions (apart from the scrotal) appearing on the skin. In the case of the intravenous inoculations the syphilitic lesions appeared in the sites of the wounds after a normal incubation period. In two human beings under their observation, who acquired syphilis shortly after receiving injuries, syphilitic lesions developed in the sites of the injuries. In the same connection Reiter,[3] in a discussion on experimental syphilis held in Vienna, recalled that some years ago Wassermann intravenously injected cancerous mice with *Sp. pallida* and found that the germs remained in the cancerous growth for weeks at a time, the other tissues apparently remaining free from spirochætes. [These experiments and clinical observations confirm others made by various clinicians that syphilis tends to become active in damaged areas. The reviewer has now demonstrated to students a very large number of examples of the localization of syphilitic recurrences in areas which have been the seat of injuries, these having often been quite trivial.—L. W. H.]

Syphilitic Infection Without a Primary Sore.—In the diagnosis of human syphilis, particularly in its later manifestations, and in prophylaxis and treatment, it is important to recognize the possibility of infection without a primary lesion. As R. Prigge[4] points out, cases of late syphilis in men, e.g., aortitis, tabes, etc., are not infrequent in which there is no history of a chancre. Further, there are cases in which a very thorough treatment of syphilis with apparently normal response has been followed by late manifestations. In these it does not follow that the treatment had failed; it may be that the patient became reinfected but no chancre appeared (see reference to a similar suggestion by Chesney and Kemp, MEDICAL ANNUAL, 1928, p. 467). Prigge advances in support of this theory certain observations in experimental rabbit syphilis (which has a close similarity to human). About 10 per cent of rabbits inoculated with a virulent strain of *Sp. pallida* develop no chancre (they are referred to in the German literature as 'Nuller'), but are nevertheless infected, as shown by the virulence of their lymphatic glands, regional and otherwise. A certain number of these 'Nuller' have been watched in the Georg-Speyer Institute for longer periods than the routine eight weeks after which such non-reactors have usually been killed, and a proportion of them, as reported by Kolle and Evers,[5] have eventually shown signs of syphilis. As examples, Prigge relates that in some cases the chancre has not appeared for as long as eight weeks after inoculation instead of the normal three, and in some the symptoms of syphilis have been delayed for several months. The protocols of three illustrative experiments show that in one no definite syphiloma appeared until seven months after inoculation; in the second a syphiloma did not develop for five months, and then it was histologically a gumma; in the third no lesion appeared at the site of inoculation, but five months later the rabbit had parenchymatous keratitis. Altogether, in two years during which this series of 'Nuller' was observed, about 25 per cent of them eventually showed symptoms of syphilis.

Immunity in Syphilis.—In certain quarters the suggestion has been advanced that, instead of commencing the treatment of syphilis at the earliest stage, it would be better to wait for general symptoms to appear, in order that the tissues may develop an immunity against *Sp. pallida.* Kolle and Prigge,[6] in a series of experiments, show that in a certain proportion at any rate of animals in which the infection has been allowed to run on before treatment is instituted and are reinoculated with a homologous strain of *Sp. pallida,* although no chancre develops at the site of reinoculation the virus penetrates to the lymphatic glands. Thus the immunity is only apparent, being limited to the skin at the site of reinoculation. Uhlenhuth and Grossmann[7] conclude that eradication of syphilis in animals is possible, though the treatment is commenced late in the disease. They show also a lasting immunity of the scrotal tissues of the cured animals *qua* the development of a fresh chancre, but as regards general infection following reinoculation had two positive and three negative results.

Prophylaxis by Chemical Disinfection at the Site of Inoculation.—The prophylactic effect of **Calomel Ointment** and of **Quinine Ointment** (Duanti-Merck) has been tested on animals by Worms.[8] He points out first the importance in all such experiments of observing the animals for long periods afterwards, testing the virulence of their glands, and shows that observation for only a short period after inoculation and disinfection may lead to a false conclusion that the disinfection has succeeded. Thus, in two animals which had been treated with calomel ointment half an hour after inoculation, a chancre did not develop for four to five months. W. Kolle and E. Evers (*see* MEDICAL ANNUAL, 1927, p. 481) have shown that in guinea-pigs, after inoculation, the virus has reached the regional glands in five minutes, and in rabbits the same has happened in thirty minutes Therefore they do not regard the prospect of prophylaxis by chemical applications at all hopefully. Worms considers Kolle and Evers rather too pessimistic, though he thinks that, with a gross infection, the chances of prophylaxis by local applications are few. In the case of animals which were inoculated only weakly, 66·6 per cent of infections followed when no prophylaxis was employed, and only 27·8 per cent after the application of an ointment. In strongly inoculated animals the prophylactic disinfection failed. In another series he compared the 30 per cent calomel with the Duanti (quinine) ointment in animals inoculated strongly and in others inoculated only slightly, as might be expected to happen in natural infections. In two rabbits which were strongly inoculated, calomel ointment used fifteen minutes later prevented infection but the Duanti ointment failed. On the other hand, the quinine ointment applied fifteen to seventeen minutes later prevented infection of a slightly inoculated rabbit. [The natural criticism of these results with weak inoculations seems to be that, considering that only two-thirds of the control animals were infected, the number of prophylactic experiments was too small to justify a conclusion, regarding at any rate the Duanti prophylactic. In the case of human syphilis the reviewer regards the possibility of the chemical disinfection preventing the primary lesion but not the infection as one of great importance. In routine clinical work he has now seen three undoubted cases in which this has happened, and the infection has been discovered later almost accidentally. It is easy to imagine that there may be many cases in which, following prophylactic disinfection, an infection without a primary sore remains latent for a number of years, and it seems to the reviewer clearly to be the duty of a practitioner who gives a patient advice on chemical prophylaxis to recommend him also to have blood tests afterwards in order to exclude the possibility of a latent infection having occurred in spite of the disinfection.—L. W. H.]

The Influence of Light on Syphilis.—L. Brown and W. H. Pearce[9] inoculated three series of rabbits with syphilis and then exposed them respectively to (*a*) diffuse sunlight filtered through an ordinary window, (*b*) artificial sunlight with a wave-length of 3022 to 5790 Angström units, and (*c*) complete darkness. The animals exposed to artificial sunlight showed the greatest resistance to development of the disease, as measured by delay in appearance of the primary lesion and in development of general symptoms, and those kept in darkness showed the least resistance.

The Effect of Heat and of Fever-producing Agents.—The successful results of malarial treatment of G.P.I. and other forms of syphilis in man have stimulated considerable research to determine whether or not the effect is due merely to raising of the body temperature. C. N. Frazier[10] reports some experiments suggested by Chesney on the effect of elevation of the body temperature by purely physical means on experimental syphilis in rabbits. He quotes as predecessors in this work Weichbrodt and Jahnel[11] and Schamberg and Rule.[12] Weichbrodt and Jahnel kept rabbits with scrotal chancres in an incubator at 105·8° for half an hour twice each day. Rectal temperatures of 107·6° to 111·2° and occasionally 113° were produced and, with progressive decrease of *Sp. pallida* in the serum from the lesions, the chancres gradually healed in three to five weeks. Schamberg and Rule (1926) gave to rabbits which had been inoculated with syphilis three to four days previously a succession of 10 to 11 hot baths at 113° each lasting 15 to 20 minutes. The sublingual temperatures of the animals rose to from 104·4° to 110°. None of the seven animals developed signs of syphilis in periods of observation of 74 to 175 days. Inguinal and popliteal glands from the two observed for 74 days, when transferred to other rabbits, failed to infect. Schamberg and Rule (1927) tested the effect of twelve and fourteen hot baths at 115° on two rabbits with chancres thirty-three days old. Sublingual temperatures reached from 105·3° to 109°. Eight days after the first bath no *Sp. pallida* could be found in serum from the chancres, and these had healed by the end of the second week. No further symptoms developed, and popliteal and inguinal glands transferred from the animals on the 75th day after inoculation failed to infect. Frazier followed the method of Schamberg and Rule. In three animals treated with ten 20-minute baths from the fourth day of incubation, one developed latent syphilis, as shown by a doubtful Wassermann reaction and infection of two normal rabbits with gland and testis material. The temperatures were raised by the baths to from 106° to 110·6°. Six rabbits in which the body temperature was not raised beyond 106·5°, the baths being commenced from the third day of incubation, developed syphilis, and the only difference between them and untreated animals was a slight prolongation of the incubation period. Five animals with syphilitic orchitis in which the temperature was raised to a maximum of 106·7° showed no effect of the treatment. The experiments show generally that *Sp. pallida in vivo* is not killed by a temperature below 106·7° maintained for twenty minutes, but that temperatures between 106·2° and 110·6° are nearer to the lethal point.

Schmidt-Ott[13] inoculated 19 syphilitic rabbits with trypanosomes. The superinfection produced a rise of temperature and some effect in the direction of healing, but did not eradicate the syphilis, even when assisted by subtherapeutic doses of 'Bayer 205', trypanosan, or neosalvarsan. Wagner and Breinl[14] inoculated 22 syphilitic rabbits with Rocky Mountain spotted-fever virus, which produced a continued fever lasting six to ten days. In 17 with chancres, 14 showed fairly rapid resolution, but in these and in 3 in which there was no visible effect the glands remained infective; 5 with latent syphilis appear to have been sterilized by the fever. The effect of antisyphilitic treatment on non-syphilitic rabbits in which a positive W.R. has been produced artificially has been studied by Mano.[15] Sachs and colleagues[16] have shown that the injection of a mixture of organ extracts and serum of another animal produces in a non-syphilitic rabbit a positive W.R. of the blood serum. Mano treated 25 such rabbits with neosalvarsan, but in only one did a permanent change to a negative W.R. result. He concludes from this that the action of arsenobenzene compounds in converting the serum reactions to negative in syphilis depends not on a direct effect on the blood, as has been suggested, but on the parasites which have evoked the tissue changes. The experiments of Sachs and colleagues show broadly that the W.R. is a true immunity reaction, the antigen being lipoids, either of *Sp. pallida* or of tissues which have been acted upon by *Sp. pallida*.

Georgi and Fischer,[17] following on the work of Sachs just mentioned, have conducted a number of experiments on syphilitic animal and human serum to determine whether or not it is possible to discover in it antibodies to lipoids of different organs, e.g., brain. With a specially prepared extract of brain they found that the serum of cases of disease of the central nervous system gave reactions in a larger proportion of cases than did that from cases with no central-nerve disease. In some cases of disease of the central nervous system the W.R. was positive only with an extract of brain lipoids. In two animals recently inoculated with *Sp. pallida* the serum was tested repeatedly with heart and with testicular extracts. The W.R. was first positive with the testicular extract. [This would be expected if one accepted the view that the W.R. depends on antibodies to tissue constituents, since the testicle was the first tissue to be disturbed by the syphilitic infection.—L. W. H.]

Prevention of Syphilis by Injection of Metals.—Levaditi, Sanchis-Bayarri, Schoen, and Manin,[18] in an article of 64 pages, have detailed the results of two years' work on the effect of **Bismuth** and of **Tellurium** in preventing the development of syphilis. They show generally that each of these metals exercises a completely prophylactic effect against subsequent syphilitic inoculation, that of a suitable preparation of tellurium lasting 108 to 116 days and that of the insoluble basic tartrate of bismuth lasting as long as 152 days. The duration of the preventive action depends on the compound employed. Thus, in the case of a soluble preparation of bismuth (the double iodide of bismuth and quinine, known as 'solubyl') the protection lasted 5 days but not 31, while after an injection of the insoluble basic tartrate of bismuth (trépol) an inoculation with *Sp. pallida* 152 days later failed to infect. Between these extremes other preparations afforded various results, bismuth metal in fine subdivision proving inferior to the insoluble tartrate or the hydroxide. Chemical analysis of the tissues of the different animals showed that, to achieve a prophylactic (or a curative) effect, the content of metal in the tissues must reach a certain minimum. [The work of Levaditi and colleagues seems highly important to the choice of preparation of bismuth for the treatment of human syphilis. The indications at present are that an insoluble compound rather than the metal itself should be employed. Also the dosage should be such as to insure a certain minimal amount of the bismuth being constantly present in the tissues, and it may be that many workers are pitching their dosage much too low to achieve the desired result.—L. W. H.]

SERUM DIAGNOSIS.

In a paper on "Five years' Application of the Kahn Test",[19] Kahn details the advantages of his test over the Wassermann. A given specimen can be tested within an hour from withdrawal of the blood, including fifteen minutes for separation of the serum, thirty minutes for inactivation, and five minutes for performance of the test. It can be carried out anywhere by a skilled serologist, as it does not require more than a fraction of the apparatus necessary for the Wassermann test, and it does not depend on the use of reagents which are relatively unstable, such as guinea-pig's complement and a hæmolytic system of blood-cells and amboceptor, but simply on the correct admixture of serum and an extract which, once standardized, remains stable for at least three years. In connection with the question of standardization, readers are recommended to study an article by R. L. Kahn, N. Nagle, and P. L. Kendrick,[20] in which the authors show that different ox hearts produce antigens which vary in sensitiveness. It is necessary, therefore, to compare each new extract with a standard which, whilst being sufficiently sensitive for practical purposes, is not so sensitive as to give non-specific reactions. A new extract which is insufficiently sensitive can be made sufficiently so by addition of extractives from other hearts, and one which is too sensitive can be brought down to the standard by dilution with alcohol.

[A recent technical conference at Copenhagen in which the reviewer participated, afforded an opportunity of comparing the Kahn test with eight methods of the Wassermann and six other flocculation tests, viz., the Meinicke, Muller's 'Ballungsreaktion', Murata, Sachs-Georgi, Sigma, and Vernes. Generally it proved almost the most sensitive, and, with the exception of the Murata, the simplest to perform. In the discussion following the technical work of the Conference the general opinion was expressed that two tests should be applied to each serum, and the question arose whether both should be flocculation tests, or one a Wassermann and the other a flocculation test. The majority of the delegates, including the reviewer, expressed the view that they would prefer for the present that one should be a Wassermann. The reason actuating the reviewer was that, although such tests as the Kahn and the Sachs-Georgi proved at this Conference wonderfully specific, one did not feel quite so safe with them as with such a method of the Wassermann as No. 1 of the Medical Research Council's Report No. 14, a point of the greatest importance to the clinician. A false diagnosis of syphilis based on a non-specific serum reaction seems to the reviewer to be a calamity of the first order, and, for primary diagnosis, he would prefer a somewhat less sensitive test, every step of which could be controlled, to one which in the best hands occasionally gives non-specific results. At the same time there is no question of the value of such a test as the Kahn for confirmation of the Wassermann, for indicating further investigation in early cases where the Wassermann is negative, and for observation of cases of syphilis which are, or have been, under treatment. In the matter of rapidity the Kahn test has an advantage over the Wassermann when the number of tests is small, but with batches of 100 or more sera, it does not score over a Wassermann which is carried out by the Donald dropping method. A test which may perhaps prove of great value as an eliminator is the Murata. In this some of the serum is put into a narrow test-tube and some cholesterolized extract of heart diluted to 1-10 stratified on it ; in a positive reaction a ring forms at the junction of the two fluids. The test is thus one of great simplicity and more rapidly performed than any other. Its sensitiveness varies with the proportion of cholesterol employed. That used at Copenhagen was 1-18, and the results were not so good as those obtained by the Kahn, but it seems to the reviewer that such a simple test made more sensitive might be employed in cases where it was desired to examine large numbers of sera, e.g., as routine on every case admitted to a general ward, and that then the sera giving positive reactions could be submitted to the Wassermann test.—L. W. H.]

VISCERAL SYPHILIS.

Unresolved Pneumonia and Post-pneumonic Complications (fibroid pneumonia, pulmonary abscess, and bronchiectasis) have been investigated in 30 cases by J. B. Youmans and R. H. Kampmeier.[21] In 10 cases the patients were living, and in 20 the condition was discovered or confirmed post mortem. Of the 10 living cases, 6 were syphilitic and 2 possibly so. Of the 20 cases examined post mortem, 6 showed evidence of syphilis and 2 were possibly syphilitic. Thus, in the 30 cases 40 per cent were associated with syphilis. [In this connection the reader may be reminded of the investigations of Chesney reviewed above on the localization of syphilis in inflamed areas.—L. W. H.] Letulle and Dalsace[22] describe certain forms of syphilis of the pleura and lung in which a marked characteristic was the irregular distribution of the lesions, which are mostly small and affect the periphery rather than the central areas. The lesions are almost certainly vascular in origin. F. E. Tylecote,[23] in a post-graduate lecture on pulmonary syphilis, says that an outstanding feature is dyspnœa. It depends sometimes on inspiratory obstruction due to tracheal or bronchial stenosis secondary to ulceration, or more rarely to pressure by a gumma, but in most cases it is due to peribronchial fibrosis. A one-sided distribution, or hilar or basal, rather than apical signs, may suggest the diagnosis, and a radiogram shows that the spread of the fibrosis, or even of the gummata, is along the vessels and bronchi. There may also be marked thickening of mediastinal shadows. He recommends, as the drug of choice in these cases, **Potassium Iodide.**

Stricture of the Urethra has been found by A. O. Ross[24] to be associated with syphilis in 78 per cent of 50 cases which he has investigated. In 66 per cent the W.R. was positive, and in 12 per cent there was a history of syphilis with negative W.R. The author says that strictures of the œsophagus and of the rectum are usually investigated for syphilis, and suggests that the same procedure should be applied to urethral stricture. He thinks that probably the gonococcus produces a greater degree of round-celled infiltration in the submucous tissues of the syphilitic. [Possibly the gonococcus provokes a greater syphilitic activity.—L. W. H.] He finds that these cases respond more readily to dilatation when antisyphilitic treatment is instituted.

Acute Syphilitic Phlebitis is not often reported. Morrow and Epstein[25] report on a case and give a review of the literature. The first record is one by Girwood in 1860 of 3 cases in the secondary stage. Roussy (1908) collected reports on 35 cases, including 2 of his own, and since 1908 " probably not more than 25 reports on the condition have appeared". Morrow and Epstein review 45 of the cases in three tables, which show that 39 occurred in the early stages and 6 in the later. The early cases are divided into two main varieties : (1) The most common, being an involvement of the superficial veins with the formation of indurated cords along their course ; (2) With nodules varying in size from a lentil to a pea in the superficial subcutaneous veins. In the late cases the deep veins are usually affected ; occasionally gummatous masses develop round a vein, which becomes involved secondarily.

Syphilis of the Uterus, apart from chancre of the cervix, is rarely reported. H. Billig[26] records a case of gummata of the body of the uterus. Clinically, fibroid was diagnosed, and a panhysterectomy was performed. The uterus measured 5 in. by 4 in. by 3½ in., and on the right side was a mass, 2½ in. in diameter, which on section looked macroscopically like a sarcoma. Microscopically the tumour mass showed a necrosis of muscle fibres, and round this a richly cellular zone of miliary and conglomerated gummata. There were gummata of various sizes, mostly miliary, throughout the myometrium of the uterus. The tubes showed a similar gummatous condition in the subserous and muscular coats. The author quotes a somewhat similar case reported by Hoffmann. Portis recorded a case of involvement of the uterus in secondary syphilis. The patient was admitted for metrorrhagia. The cervix was thickened, indurated, and ulcerated, and panhysterectomy was done under a diagnosis of carcinoma. Microscopically there were signs of a healing chancre on the cervix ; the endometrium and myometrium were densely infiltrated with lymphocytes and plasma-cells, and the left ovary showed a corpus luteum similarly affected. *Sp. pallida* was found in cervix and myometrium, and an occasional one in a corpus luteum and the stroma of left ovary. Rhatonyi[27] (Bucharest) reports five cases of syphilis of the uterus. In these the uterus was uniformly enlarged, and menorrhagia and metrorrhagia, due to syphilitic endarteritis, appear to have been prominent features.

The Relation of Syphilitic Leucoplakia of the Uterus to Cancer is emphasized by Mérill,[28] who mentions that 50 per cent of cases of cancer of the cervix have a positive W.R., and that a leucoplakic condition of the mucous membrane is very often present. He says there exists a pre-cancerous leucoplakia of the cervix similar to that of the tongue, and thinks it probable that leucoplastic alterations of the cervix and, perhaps, of the body of the uterus play an essential rôle in the pathogenesis of a great number of uterine cancers.

Syphilis of the Stomach.—A study of recent papers by David Smith,[29] H. L. Bockus and J. Bank,[30] and C. Herman[31] leaves one with no certain criteria by which a diagnosis can be made before antisyphilitic treatment has been instituted. Wile classifies gastric syphilis into catarrh, ulcer, submucous gumma, diffuse syphilitic infiltration, pyloric syphilis, and perigastric syphilis : which affords at least an impression of the number of non-syphilitic gastric conditions which the syphilitic can imitate. Bockus and Bank analyse 23 of their cases with coincident syphilis and gastric symptoms, and classify them into 4 with symptoms of peptic ulcer, of which 2 were considered to be syphilitic ; 2 with gastritis and achlorhydria, which may have been due to early syphilis of the stomach ; 5 with diffuse fibrosis and symptoms suggesting carcinoma, in which 2 proved to be syphilitic, this diagnosis being suggested by the marked disproportion between the degree of gastric disorder and the general condition of the patient ; 5 with symptoms of pyloric obstruction, in 1 of which the cause was syphilis; 7 with duodenal ulcer, 1 being syphilitic. Herman's hint for the distinction of gastric syphilis from carcinoma is that the stomach has a cancer but not the patient, and Carman and Eusterman comment on the fact that in the syphilitic condition the patient does not appear ill in proportion to the extent of stomach involvement as shown by the radiograms. [In the absence of any very clearly defined signs by which syphilis of the stomach can be diagnosed, it is clear that an essential step in the investigation of any case presenting gastric symptoms prominently is to examine him for syphilis. If this is found, it is easy to institute a therapeutic test which may alter the whole outlook.—L. W. H.]

Cardiovascular Syphilis.—A long discussion held by the Societé Médicale des Hôpitaux[32] on the diagnosis and treatment of cardiovascular syphilis showed generally the difficulty of distinguishing syphilitic from certain non-syphilitic affections of the myocardium and aorta. Donzelot, in opening the discussion, expressed the view that many cases are treated as syphilitic which are otherwise, and that the treatment may do harm even in specific cases when the cardiac action is poor and reno-hepatic functions are bad. Most of those who took part in the discussion, notably Sézary, agreed that great care is necessary in these cases, but when there is even a suspicion of syphilis the patient should have the benefit of specific treatment. In this there seemed to be a definite tendency to favour bismuth or mercury rather than arsenobenzene compounds. [There is no doubt that great care is necessary in the use of arsenobenzene in cardiovascular syphilis, but on the line of small doses repeated frequently, say two or even three times a week, the benefit from its use cannot be denied.—L. W. H.]

Neurosyphilis.—In a paper on "Reflections of the Neurologist on the Treatment of Syphilis", Dattner[33] draws attention to the fallacy of relying on pupil reflexes and serum tests in latent syphilis. He points out that as many as 30 per cent of paralytics show no pupil disturbances. Rosner found in 207 tests of serum and fluid that the serum was negative but the fluid positive in 8·9 per cent. In cases with positive fluid, Rafka found 18·7 per cent with negative or only weakly positive serum, and Dattner found 20 per cent. A persistently positive fluid is of bad omen; in a material of many hundred syphilitics Dattner and Kraus have seen only one case over 60 years of age with a positive fluid but no clinical sign of neurosyphilis. On the other hand, Mras has not seen a case with persistently negative fluid develop metasyphilis. Dattner recommends in latent cases an examination of the fluid every six months, and that in latent syphilis with positive fluid malarial treatment should precede chemotherapy. In cases where malarial treatment is contra-indicated he gives old tuberculin twice weekly, commencing with 0·000001 grm. and doubling each time if no reaction has occurred. Eventually a dose of 1 grm. is reached, so that the treatment lasts a long time.

TREATMENT.

General Considerations.—An article by Sir Almroth Wright,[34] entitled, "A Discourse on Ehrlich's Chemotherapy, and on certain general principles which require to be brought into application in all treatment of bacterial disease", explains in the author's stimulating way of presenting a problem and its solution how bacteria, including *Sp. pallida*, can escape attack by therapeutic agencies, and means by which its defence can be turned. The article should be studied in the original, since such an extract as is possible here cannot convey all that a syphilologist troubled by the intractability of syphilis in certain stages would find useful. Answering the question why a drug which is efficacious when applied to one part of an infecting microbic population is ineffective with respect to another part of that population, the author says this other part "lies in regions so physiologically remote that it might quite safely be postulated in connection with treatment by arsenic that even were 1000 times a lethal dose to be administered, no trace of that agent would ever penetrate there" Apart from districts to which chemical agents cannot penetrate because of the barrier of vascular endothelium or secretory cells of glands, portions of the tissues may be shut off from the general circulation proportionately or absolutely, by arrest of the blood-stream consequent on intravascular clotting or intermittent shutting down of capillary loops, and in such 'ecphylactic niduses' the germs may lie safe from bacteriotropic agencies circulating in the blood. [It is not difficult to imagine such a state of affairs in syphilis, which is essentially a disease of blood-vessels leading to local arrest of circulation.—L. W. H.] Besides the disease mechanism leading to formation of ecphylactic niduses there is a physiological one in the spleen. "Barcroft has shown that the spleen regulates the volume of blood in circulation by loading itself with additional blood when the volume of the circulating fluid is in excess of requirements; and by disbursing that blood when a larger volume of circulating fluid is required. It needs no gift of second sight to see that the withdrawal of blood into the stagnant diverticulum of the spleen will, in the case where that blood is infected, provide the microbes with opportunities for encasing themselves in ecphylactic envelopes". The problem of combating this formation of ecphylactic niduses is mainly summed up in opening up blood-vessels which have become temporarily closed down, and in promoting contraction of the spleen so as to force out the bacteria there into the general circulation. In cases where a nidus has been formed by intravascular coagulation, **Citric Acid,** by lowering the coagulating power of the blood, should be an effective combating agent. Repeated small doses of **Arsenobenzene** compounds also lower the blood coagulability, and the author suggests that this may be the reason that such a practice is effective, though, considered as a method of sterilization purely on the basis of chemical versus microbe, it is theoretically unsound. If the repeated salvarsan dosage owes some of its effectiveness to a lowering of the blood coagulability, and thus to opening up of ecphylactic niduses, it might be that a better plan of treatment would be first to give citric acid in doses sufficient to lower the blood coagulability, and only then to give the first dose of salvarsan. Niduses in the skin can be opened up by heat and vasodilators. A contractile effect on the spleen would be produced by calling more blood to the skin or by acting on it directly with such agencies as adrenalin.

[There may be in this an explanation of the success of certain adventitious agencies in the treatment of syphilis. In the pre-salvarsan era hot-air baths were considered valuable aids to treatment, and now fever-producing agencies (malaria, infections with various types of spirochætes, non-specific vaccines, etc.) have established for themselves a definite place in the management of syphilis. These last are at present considered by most workers to act by virtue of the lethal effect on *Sp. pallida* of high temperature, but it may be that at least some credit is due to an opening out of closed foci. In this connection some remarks by Krundratitz at a recent congress in Vienna are interesting. This worker said he had demonstrated in old cases of congenital syphilis under treatment with malaria that in the seventh or eighth paroxysm *Sp. pallida* appeared in the blood. He considered that the attacks of fever acted by opening out nests of *Sp. pallida*, thus exposing them to attack by arsenobenzene compounds. Also, it is usually considered necessary to follow up a fever treatment with chemotherapy, an acknowledgement that fever in itself is insufficient to bring about the destruction of *Sp. pallida*.—L. W. H.]

Pyrexial Therapy.—R. G. Williams[35] shows that the liver is usually affected more or less severely by malarial treatment. In three fatal cases a condition of acute yellow atrophy was found. [This observation is of practical importance in respect of the time chosen for the institution of malarial therapy. Arsenobenzene treatment damages the liver, and it may be well, for this reason alone, to allow a fairly considerable interval to elapse between the last course of arsenobenzene treatment and the malarial inoculation so that the liver may have a chance to recover. The results of malarial treatment have shown quite conclusively that in all forms of intractable syphilis (not merely general paralysis and tabes) such a line of attack ought always to be considered. On the other hand, malaria is not free from danger to life, and the gross destruction of red cells which it occasions leaves the patient in a debilitated condition, which makes it a form of treatment not to be undertaken at all lightly. It is not surprising therefore that many workers have turned their attention to the discovery of fever-producing agencies which, whilst being equally effective, are more controllable and less debilitating. Some of the work on these lines is reviewed below.—L. W. H.]

E. Signorelli[36] reports well on the use of relapsing fever inoculation in general paralysis. The effect is enhanced by the use of bismuth and arsenic. M. Kunde, G. W. Hall, and F. J. Gerty[37] report on the treatment of 49 cases of general paralysis by intravenous injections of typhoid vaccine, with very encouraging results, 21 having been restored to their former social positions or to work at their previous occupations. The vaccine was diluted to a strength of 200 million per c.c., and the initial dose was 50 million. The injections were given every other day to a total of 18 to 23 per course, and the dosage was increased according to the temperature produced by the previous injection, the aim being to provoke a temperature of 103° to 104°. In most cases this was effected by an increase of 100 million per dose. After two months the course was repeated. The great advantage of the treatment was the good general condition of the patients between paroxysms, a great contrast to the malarial case. In the discussion following this paper, Dr. Hall saw no reason why the temperature should not be forced up to 105°.

J. M. Mackenzie[38] reports shortly on 13 cases treated by the following procedures in succession: (1) Ten daily intravenous injections of T.A.B. vaccine in doses from 300 to 6000 million; (2) Four intravenous injections of '914' (0·45 grm.) at weekly intervals: (3) Ten vaccine injections in doses from 1500 to 25,000 million; (4) A repetition of (2); and (5, 6) A repetition of (3) and (4) respectively. Between each of the above series the interval was four weeks. The vaccines produced average temperatures quite equal to those resulting from malaria. Generally, the results were good.

Bismuth.—J. V. Klauder,[39] reviewing the question of using the intravenous route in the administration of bismuth, concludes that, considering its greater toxicity by this route (at least four times), which necessitates limitation of dosage, and its rapid excretion, it is doubtful if the intravenous method is more effective than the intramuscular and if it should be employed solely in early syphilis. In early cases where there is intolerance of arsenic, intravenous injections might be used (because of their greater spirochæticidal effect), but then in conjunction with intramuscular. J. H. Stokes and S. O. Chambers[40] report on two years' experience of a combination of bismuth and sulpharsphenamine (bismuth arsphenamine sulphonate) prepared by Raiziss, known by the trade name of **Bismarsen.** Its chief claim to consideration is that it makes for simplicity of treatment. It was administered deep subcutaneously in doses of 0·2 grm. dissolved in 1 c.c. water twice weekly in courses of 18 to 20, but sometimes as many as 40, injections. The authors added to each dose 2 min.

of a 2 per cent solution of butyn, as a local anæsthetic. Theoretically bismarsen contains 17·2 per cent arsenic and 31·7 per cent bismuth, but actually 12 to 15 per cent arsenic and 23 to 25 per cent bismuth. [Thus the weekly amount of arsenic and of bismuth administered in the form of bismarsen is much less than in a course of '914' and bismuth.—L. W. H.] The drug appears generally to have been tolerated quite well; 6 out of 204 patients could not stand the local discomfort, but in the great majority this was no greater than after other forms of bismuth. The therapeutic effect was good, but slower than with drugs commonly employed.

Levaditi and Fournier[41] in an article replying to criticisms of bismuth, after repeating the experimental and clinical evidence that this metal is actively destructive of *Sp. pallida*, mention that since 1921 one of them has relied almost exclusively on bismuth for the treatment of over 4000 cases of syphilis. They are unable to explain the difference between their results with bismuth-stovarsol (bistovol) and those reported by T. Anwyl-Davies,[42] who had found *Sp. pallida* active in the secretion of lesions as long as five days after doses of 0·75 and 0·9 grm. In most of Levaditi and Fournier's cases *Sp. pallida* had disappeared within forty-eight hours. They report good results in rabbits and men from a clear and stable solution of bistovol (H. 13) which has the remarkable chemo-therapeutic index of 1 to 35. In human cases they appear to have given intramuscular injections twice weekly of either 5 c.c. of a 2 per cent solution or 2 c.c. of a 10 per cent solution to a total of 10 or 12 for a course. They say that in primary and secondary cases *Sp. pallida* disappeared rapidly, and the serological reactions were rendered negative or nearly so by such courses. They have found that bismuth-stovarsol, either in solution (H. 13) or in tablets, is effective when given orally. In a secondary case with persisting primary sore which may be quoted as an example, the *daily* dosage of H. 13 was as follows: Sept. 11 to 18, 20 c.c. (*Sp. pallida* disappeared on the second day and the rash cleared); Sept. 19 to 25, 20 c.c.; Oct. 6 to 27, 20 c.c.; Oct. 22 to 28 (*sic*), 25 c.c.; Nov. 15 to 27, 10 c.c.; Dec. 8 to 19, 20 c.c.; Jan. 8 to 15, two tablets of 0·5 grm. daily. Thus in 126 days 119 grm. bismuth-stovarsol was administered without ill effect.

The absorption of different bismuth compounds after intramuscular injections has been studied in animals by W. F. v. Oettingen, T. W. Todd, and T. Sollmann.[43] They found that of (*a*) bismuth hydroxide in watery suspension, (*b*) potassium bismuth tartrate in oily suspension, (*c*) bismuth sodium citrate solution, and (*d*) bismuth sodium tartrate solution, (*a*) and (*b*) were poorly absorbed, considerable quantities being present in the injection site three months later, and (*c*) and (*d*) satisfactorily so. Bismuth sodium citrate in neutral solution (pH 7·2) appeared to be tolerated locally much better than bismuth sodium tartrate. H. Müller and Kohlenberger,[44] aiming to find a preparation of bismuth which would be absorbed reasonably quickly and yet be retained in the body for a sufficient length of time to maintain a continuous action on *Sp. pallida*, have found **Spirobismol**, which is a combination of lecithin with bismuth-quinine-iodide in an oily solution, more satisfactory than others. The radiographic shadow disappeared soon from the site of the injection, yet bismuth was still present in the urine sixty-eight days after a course.

For Wassermann-fast cases L. G. Beinhauer and F. M. Jacob[45] recommend a course of 0·6 grm. **Sodium Thiosulphate** intravenously twice weekly, with 15 gr. of the same by mouth each day for five to six weeks, followed by five doses of '606' and then a six weeks' course of injections of **Mercuric Chloride**. Under such a course the W.R. of 24 out of 28 cases which had resisted treatment for at least two years previously was improved, and in 10 cases it became completely negative, remaining so for more than a year without further treatment.

Syphilis and Marriage.—F. Pinkus,[46] opening a discussion (in which Finger, Jadassohn, Zieler, Löhe, and Buschke took part) on the period after infection after which a syphilitic might marry, divided his cases into untreated men, treated men, untreated women, treated women. In untreated men the length of infectivity varies, but the longest in the writer's experience was six years. When the age of infection is unknown the age of the patient may guide, a man of 40 being generally much less often infectious than one of 22. A man who has been thoroughly treated from the primary stage is theoretically non-infectious and able to marry at once; practically, he should postpone for at least two years, as recommended by the German Ministry of Health. If he was in the secondary stage when treatment was commenced, he should wait at least six years, and marry then only if no signs have appeared under careful observation for two years. In women, Pinkus has found that treatment prior to marriage and pregnancy has protected only half the children. Finger raised another point in the effect of infection on the wage-earning capacity, and would make revelation of the fact of infection to the other party compulsory as in Germany and Switzerland. Jadassohn considered that, in women infected more than eight years previously and treated well, there was little chance of children being infected even though specific treatment was not given during pregnancy. Zieler considered that thorough treatment before marriage would dispense with treatment during pregnancy. He cited 21 women so treated who bore 34 children, none of whom showed any signs up to eight years of age. Buschke considered that three courses of treatment and a delay of at least three years should be insisted on in the most favourable cases.

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SYPHILIS OF THE CENTRAL NERVOUS SYSTEM.

Sir James Purves-Stewart, K.C.M.G., C.B., F.R.C.P.

Cerebrospinal Fluid in Neurosyphilis.—The importance of examination of the cerebrospinal fluid in the diagnosis of neurosyphilis has been recognized for nearly thirty years. Early observations were directed chiefly to the presence of abnormal cells in greater or smaller numbers as enumerated in a counting-chamber. The maximum number of leucocytes in a healthy fluid has been stated by some observers as 3 to 5 per cubic millimetre, whereas other observers place the normal maximum as low as 0·5 per c.mm. It is common knowledge that the commonest type of cell in neurosyphilis is the lymphocyte, and that the plasma-cell when present is specially suggestive of general paralysis. Beyond these elementary points, qualitative study of the fluid, relatively speaking, has been more or less neglected. An important paper by P. Ravaut and R. Boulin,[1] however, shows how, by means of a special method of staining, differential study of the various types of cells in the cerebrospinal fluid may throw an important light not only on the diagnosis but also on the prognosis of neurosyphilis.

The technique employed by Ravaut and Boulin is a simple affair. Five c.c. of cerebrospinal fluid are centrifuged for ten minutes at high speed; the fluid is decanted off, and the deposit clinging to the bottom of the inverted tube is collected in the usual fashion by means of a capillary pipette and placed on a glass slip. A drop of the Unna-Pappenheim stain, viz., *pyronin-methyl-green*, is added, and a coverslip is laid on in the usual way. The only drawback to this simple technique is that after twenty-four hours the preparations undergo changes and are not permanent affairs. Nevertheless, vital staining of the cells, achieved in this way, is preferable to other methods which imply desiccation and fixation of the deposit under investigation.

The pyronin-methyl-green stain colours the nuclei pale-blue or violet, the nucleoli are bright-red, the protoplasm of the mononuclear cells is pale-red, whilst the protoplasm of the plasma-cells is specially stained a deep-red colour. Staining may occur either immediately, showing up the blue nucleus with red nucleoli and protoplasm, or it may be slow, occupying from a few minutes up to several hours. Ravaut and Boulin insist that those cells which stain immediately are dead cells, whereas those which stain gradually are living elements.

Applying the foregoing method to the cerebrospinal fluid in cases of neurosyphilis, an unexpected variety of cells can be demonstrated, including the following :—

Naked Nuclei (*Plate LVIII*, 8, 9).—These are either large, about 6μ, containing a nucleolus, indicating a vital cell; or they may be small, about 4μ, indicating a dead, degenerated cell.

Lymphocytes (*Plate LVIII*, 10, 11).—Averaging about 7μ in diameter. These have a blue nucleus and a single red nucleolus, with a narrow ring of pink protoplasm around the nucleus.

Small mononuclears (*Plate LVIII*, 12–14), averaging about 9μ in diameter, about half of which is made up of the general protoplasm. There may be one or two nucleoli, and the nucleus itself may be displaced and even multiple.

Large mononuclears (*Plate LVIII*, 15–18), about 20μ in diameter, only a quarter of which, as a rule, is occupied by the nucleus, which may be enlarged and irregular in shape.

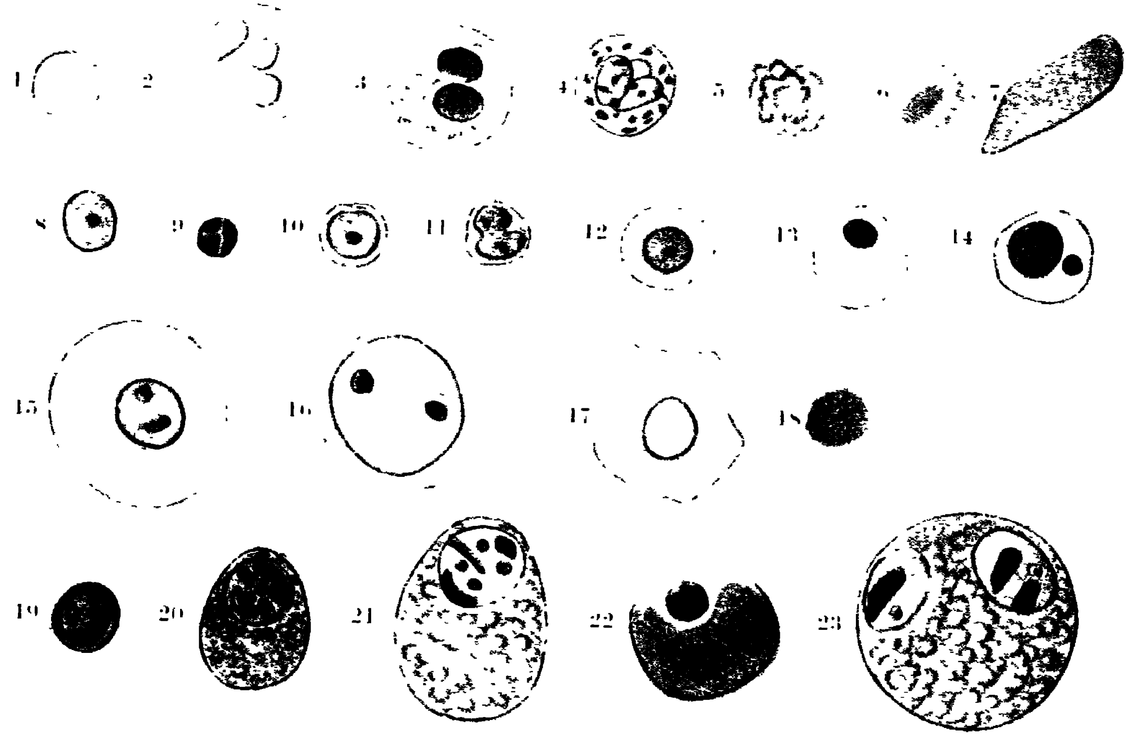
Polynuclears (*Plate LVIII*, 2–4), similar to those of the blood, mostly neutrophils with three or four nuclei; less commonly eosinophils with two characteristic semilunar nuclei and granular protoplasm.

Plasma-cells (*Plate LVIII*, 19–23), of which five varieties are described. The commonest is the medium-sized plasma-cell, of 12μ or thereabouts, half of which is taken up by the pale nucleus, whose outline is much more regular than that of the small mononuclear. This plasma-cell has one or more large bright-red nucleoli, and its protoplasm has a granular structure. The small plasma-cell, measuring about 7μ, is less common, the nucleus occupying almost the whole cell, with a small ring of surrounding protoplasm. The large plasma-cell, measuring about 25μ, resembles the common medium-sized variety except for its larger size. Polynuclear plasma-cells may be met with containing two or three nuclei. Lastly, we may find degenerated plasma-cells, either with

PLATE LVIII

STAINING OF CEREBROSPINAL FLUID IN NEUROSYPHILIS

P. RAVAUT AND L. BOULIN



1. Red corpuscle; 2–4. Polynuclears: neutrophil (2), eosinophil (3), basophil (4); 5, 6, 7. Cellular debris; 8, 9. Naked nuclei; 10, 11. Lymphocytes; 12, 13, 14. Small mononuclears; 15–18. Large mononuclears: typical (15, 16), atypical (17, 18); 19–23. Plasma cells: small (19), medium (20), large (21), degenerated (22), polynuclear (23).

By kind permission of Drs. Ravaut and Boulin, and the 'Annales de Dermatologie'

a degenerated deeply stained nucleus devoid of nucleoli, or with vacuolation of the general protoplasm.

What are the cytological pictures in the cerebrospinal fluid in the various stages of syphilis?

1. In the Early and Septicæmic Stage of Syphilis.—Whether clinical signs be present in the nervous system or not, there are usually definite cytological changes in the cerebrospinal fluid. These are characterized by the presence of vital cells, mostly small mononuclears with a smaller proportion of lymphocytes. Polynuclears may also be present, but always in small numbers. In addition to the foregoing vital cells, there may also occur large mononuclears and plasma-cells of small or medium type. A cellular reaction consisting purely of lymphocytes and small mononuclears indicates a superficial meningeal reaction with a favourable prognosis, even when the cells are large in number. On the other hand, the occurrence of plasma-cells with small mononuclears suggests the presence of parenchymatous degeneration in the central nervous system and has a less favourable prognosis.

The persistence of plasma-cells is an indication to persevere with energetic treatment, even in the absence of other clinical signs. Meanwhile other pathological reactions may be demonstrated in the cerebrospial fluid, e.g., the presence of globulin, a positive Wassermann reaction, and a positive gold-curve or benzoin-curve.

2. In the Period of Later Syphilis.—This comprises several different clinical types, as follows:—

a. Old Syphilitics without Clinical Signs of Nervous Lesion.—If the cerebrospinal fluid is normal, good and well. But sometimes we may find an unexpected latent reaction of varying degree. The minimal reaction consists simply in the presence of a few lymphocytes. A more severe reaction is shown by the presence of lymphocytes with small mononuclears. The third and most serious type is when, in addition to the foregoing, we find plasma-cells and large mononuclears.

b. In Syphilitic Vascular Lesions.—The cerebrospinal fluid may sometimes be cytologically normal, in which case the lesion is a deep-seated affair unconnected with the meninges. When these latter are implicated, i.e., in meningovascular syphilis, we note the presence of lymphocytes and small mononuclears, with or without the addition of large mononuclears and plasma-cells as above described.

c. In Cases of Tabes.—The commonest finding is the presence of lymphocytes and small mononuclears. Plasma-cells are uncommon, save in an active and rapidly advancing case. In old-standing or chronic tabes we may find either large degenerated dead cells, or a mixture of feebly vital lymphocytes and small mononuclears with a varying number of plasma-cells. Polynuclear cells are usually absent.

d. In Paralytic Dementia.—Here we constantly have cytological changes of varying degree and character. In every case we find ourselves dealing with highly vital cells of extraordinary polymorphism. All the types of cells above described may be present, as might be expected from the constancy of meningeal lesions. Usually the mononuclears and lymphocytes predominate, but plasma-cells are almost invariably present as well, especially in untreated cases. Large plasma-cells and polynuclear plasma-cells are almost pathognomonic of paralytic dementia.

The foregoing researches indicate that in neurosyphilis there are two distinct types, or rather two degrees of severity, of cellular reaction in the cerebrospinal fluid. The two types often coexist or overlap. The first type, corresponding to the appearance of lymphocytes and small mononuclears, with perhaps as few polynuclears, indicates a superficial meningeal inflammation, such as may occur in other forms of meningitis—tuberculous, meningococcal, etc. The second type, manifested by the superaddition to the foregoing of plasma-cells and of large mononuclears, indicates a deep-seated parenchymatous inflammation. It may occur in grave cases during the secondary or tertiary phase of the disease, but attains its maximum intensity in deep-seated parenchymatous disease, especially in paralytic dementia. The cytological study of the cerebrospinal fluid therefore, especially when carried out by a vital stain such as pyronin-methyl-green, helps us to indicate whether we are in the presence of an advancing or a stationary case, and whether the prognosis is grave or favourable.

REFERENCE.—[1]*Presse méd.* 1928, July 14, 881.

SYPHILIS OF THE LUNG. (*See* LUNG, SYPHILIS OF.)

TABES DORSALIS. (*See also* OPTIC NERVE, AFFECTIONS OF.)

TESTICLE, RETAINED.

John Fraser, Ch.M., F.R.C.S.Ed.

The view that the descent of the human testes takes place in order to avoid atrophy from pressure by the musculature of the abdominal wall or inguinal canal has seemed inconclusive, and it is interesting to study the work of Hannerstein,[1] of Amsterdam, in which he puts forward the view that the testicular descent is achieved in order to maintain these organs at a comparatively low temperature, or at least at a temperature substantially lower than that of the abdominal cavity. This idea probably originated in the work of C. R. Moore and R Oslund,[2] who showed that the formation of spermatozoa could be arrested by raising the temperature of the scrotum. If the scrotum of a ram was kept wrapped in cotton-wool so as to raise the local temperature, spermatozoa disappeared from the testis after eighty days. This work has been confirmed by several investigators, and the author of the article under review contributes further confirmation by recalling the peculiar structure of the scrotum—the thin skin supplied with numerous secretory glands, the absence of subcutaneous fat, the existence of the sheet of dartos muscle capable of bringing the testis in contact with the warm abdominal wall or otherwise—all provisions designed to regulate the temperature of the organs contained in it. The practical bearing of these observations is of great significance. If these views are correct (and there is no reason to doubt their accuracy) the indication is that, instead of delaying until the child is six or seven years old, retained testes should be replaced within the scrotum as early as possible after birth, if we are to maintain their active secretory function. The idea is a revolutionary one, but it has the weight of what appears to be sound experimental and clinical evidence.

REFERENCES.—[1]*Zentralb. f. Chir.* 1928, July, 1734; [2]*Endocrinology*, 1924, July, 493.

TESTICLES AND SEMINAL VESICLES, AFFECTIONS OF. (*See also* GONORRHŒA.)

Sir John Thomson-Walker, F.R.C.S.

Excretion by the Epididymis and Seminal Vesicles.—The proteins secreted by the epididymis and seminal vesicles, after admixture with the bladder urine, may be sufficient in amount, W. T. Belfield and H. C. Rolnick[1] state, to show a precipitate in the urine on boiling or by means of the cold nitric acid test, although urine obtained from the same person at the same time by means of ureteral catheterization, when so tested, may show no precipitate. These writers claim that when certain drugs are introduced into dogs intravenously they can be shown to be excreted by the body of the epididymis, and that when they are introduced in the same way into the human subject evidence of their presence in the seminal vesicles can be obtained. **Neoarsphenamine** and **Sulpharsphenamide** were injected intravenously and intramuscularly respectively in thirty cases of "non-tuberculous prostatovesiculitis" which had not responded satisfactorily to the usual methods of massage of the prostate and stripping of the vesicles. After four or five injections at two- to four-day intervals, "all evidence of infection was promptly abolished" in fifteen cases. The writers advocate a more extensive trial of these drugs in the treatment of non-tuberculous infections of the genital and lower urinary tracts.

Funiculitis.—Cellulitis of the spermatic cord has long been recognized as a fairly common affection in the East. A. B. Ibrahim[2] states that during the four years 1921–4, 105 cases were admitted to the Kasr-el-Aini Hospital, and about double this number were treated as out-patients. These figures represent the severe or moderately severe cases, which form a very small percentage of the total incidence. The commonest form is so mild and of so short a duration that only the better-class patients are apt to seek advice on its account. It occurs chiefly in the second quarter of the year in young men, is usually unilateral, and the attacks are usually repeated at variable intervals. Castellani believes the condition to be a filarial disease with a superadded streptococcal infection. Three varieties of the disease may be described: (1) gangrenous, (2) suppurative, (3) non-suppurative. The last variety may be further subdivided into a severe and a mild form. The *gangrenous type*, the rarest of all, is associated with thrombosis of the vessels of the cord with gangrene of the testicle and more or less of the cord. The onset is sudden, the patient is soon profoundly septicæmic, and dies in a few days in spite of early treatment. *Acute suppurative funiculitis* starts suddenly, with rigors, vomiting, and fever, and the spermatic cord becomes painful and swollen. Suppuration rapidly ensues, which in the more severe types may spread to the pelvic and retroperitoneal cellular tissues. There is no tendency to spontaneous recovery, and unless operative measures are adopted septicæmia or pyæmia sets in. A 20 per cent eosinophil count is a typical finding in the blood-picture. The *non-suppurative* variety is by far the most commonly met with. The onset is sudden, but constitutional symptoms do not usually amount to more than a slight degree of fever. There may be dragging pain in the groin and a moderately hard and tender swelling of the spermatic cord. The writer looks upon funiculitis as the main, if not the only, cause of hydrocele in Egypt up to this time regarded as idiopathic. Owing to the lymphatic and venous obstruction which results from repeated mild attacks of endemic funiculitis the hydrocele forms, and may be looked upon in the same light as the subcutaneous lymphatic œdema met with in cases of elephantiasis. A good account of the pathological findings in the spermatic cord is given. (*See also* SURGERY IN THE EAST.)

Acute Epididymitis.—As the result of a study of 3000 cases of this condition, M. F. Campbell[3] concludes that **Rest in Bed** with splinting of the scrotal contents by means of a carefully applied adhesive **Suspensory Bandage,** and the application of an **Ice-bag** and cessation of all urethral treatment in gonorrhœal cases, may be considered the most suitable means for the non-surgical treatment of the condition in question. **Epididymotomy** affords immediate relief from pain, and was performed in 178 cases, thus being indicated in about one in every fifteen cases. On the average, the patient who is subjected to this operation is in hospital only 3·7 days longer than the patient who is not operated on. Subcutaneous puncture of the epididymis is not recommended. It is better to open the tunica vaginalis, expose the epididymis, and puncture it repeatedly with a Hagedorn needle, and afterwards leave a small cigarette drain for twenty-four hours. Superficial or deep scrotal infections not infrequently follow epididymotomy. The former are not alarming, but the latter sometimes involve the testis, with abscess formation, necessitating orchidectomy, as occurred eight times in the series under review. Thrombosis of the cord, secondary to collateral infection, was found four times, and resulted in gangrene of the testicle. Recurrence after epididymotomy is occasionally seen, and in such cases epididymectomy is usually indicated, particularly when the symptoms are severe.

Operations on the Epididymis and Vesicles.—H. C. Rolnick[4] describes a modification of the operation of *vaso-epididymostomy* whereby the distal cut end of the vas deferens is implanted into the rete testis through an incision in the tunica albuginea close beside the body of the epididymis. Of fourteen bilateral operations carried out in seven dogs, two of the operations were apparently successful.

In operations on the seminal vesicles a good exposure of the diseased organs is essential. A number of *routes* have been advocated by different operators: (1) Suprapubic, with retraction of the empty bladder forwards; (2) Suprapubic transvesical; (3) Inguinal; (4) Perineal; (5) Ischiorectal. With regard to the relative merits of these routes, J. H. Morrissey[5] states that the first route is dangerous on account of the difficulty of avoiding injury to the peritoneum owing to adhesion of diseased vesicles and vasa; this route is also unsatisfactory because of the difficulty of obtaining a good exposure or of establishing adequate drainage. The fourth route is one which involves considerable technical difficulty and there is danger of injury to the rectum, but the wound heals well and the mortality is less than when operation is by the route just mentioned. The third route should be discarded as impracticable. The second route is undesirable unless removal of one or both vesicles is to be combined with prostatectomy. The fifth route is satisfactory, and is particularly recommended for the removal of tuberculous vesicles. The technique employed by the writer when using the last route is described in some detail, as is also that employed for the perineal route.

In the presence of perivesicular disease the seminal vesicles are often densely adherent, and at best may only be drained or incompletely removed when approached by the perineal route. V. C. Hunt,[6] in performing the operation of posterior resection of the rectum for carcinoma, has frequently noted the accessibility of the seminal vesicles through the incision used for this purpose. A modification of this incision, whereby displacement of the anus and any injury to the sphincters is avoided, is made in the middle line, starting from a point 2·5 cm. above the anus and extending to the level of the fourth posterior sacral canal, after having placed the patient in the prone position with the pelvis well elevated and having established sacral anæsthesia. The levatores ani muscles are divided in the anococcygeal raphe and retracted laterally, and the tip of the coccyx is excised. In this way a good exposure of the rectum is obtained, together with sufficient mobilization to allow of lateral retraction of this viscus so as to provide adequate exposure for extirpation of the seminal vesicles. The vesicles, as they lie above the prostate, extend laterally and posteriorly around the anterior and lateral aspects of the rectum, which they in reality embrace, and are separated from the rectum in their lower third only by the rectovesical fascia. The reflection of the peritoneum covers the superior two-thirds of the vesicles, and is readily deflected upward after division of the rectovesical fascia. Mobilization of the rectum and lower portion of the sigmoid and their lateral retraction immediately expose the vesicles after division of the rectovesical fascia; accurate visible dissection and complete extirpation of the vesicles is thus facilitated.

After removal of one vesicle, the rectum is retracted to the opposite side and the other vesicle removed in a similar manner. Drainage is instituted in all cases. The writer has used the method in five cases, in all of which the vesicles were densely adherent by virtue of extensive perivesicular inflammatory reaction.

Genital Tuberculosis.—F. Kidd,[7] in a paper on the treatment of tuberculosis of the male genital tract, states that " in a case of tuberculous testicle, if there is no increased frequency of micturition and no pyuria, there is no need to insist on cystoscopy. If, however, there is pyuria, or even if there is increased frequency without pyuria, then cystoscopy is imperative. Only thereby can the condition of the kidneys be certainly determined." The writer emphasizes the importance of giving **Tuberculin** treatment a full trial in early cases of genital tuberculosis before considering the adoption of surgical measures.

Kenneth Walker[8] lays emphasis on the fact that, although the treatment of genital tuberculosis now lies in the hands of the surgeon, the disease must not be regarded as an isolated unit that can be dealt with entirely by operation, but as a local manifestation of a general condition requiring the adoption of all the general and local measures known to be of value in raising the resistance of a patient to tuberculous invasion. The writer is of opinion that **Epididymectomy** is the operation which is most generally useful. Vesiculectomy, although based on a correct understanding of the pathology of the disease, is, in his opinion, rarely necessary, since removal of the lesions in the testicles is usually followed by marked regression of those in the prostate and vesicles. This regression is materially assisted if to epididymectomy are added other methods of treatment—**Climatic, Dietetic,** and the use of **Heliotherapy, X Rays,** and **Tuberculin.** If an improvement in the central lesions does not occur under such treatment, then **Vesiculectomy** and the removal of grossly infected tissue in the prostate should be carried out as a secondary measure. In advanced cases of tuberculous vesiculitis and prostatitis, and when fistulous tracts exist, the radical operation should be performed as a primary measure. Possibly it may also be carried out in a few cases of less advanced disease where the mode of life and environment of the patient are so unfavourable that from the outset he is severely handicapped in the fight against the tuberculous invasion.

J. D. Barney,[9] discussing genital tuberculosis in the male, states that Kenneth Walker's studies do not explain the well-known clinical observation that whereas both ends of the vas deferens are thickened and nodular, the middle third is often but little if at all affected. Walker states that " the thickening found at the bladder end of the vas marks the lymphatic track along which the bacilli spread. On reaching the lower pole of the epididymis a favourable soil is encountered. From the focus thus found a secondary wave of infection begins by the breaking down of the nodule and the passage of its infected material into the lumen of the vas." Barney considers that this theory, while ingenious, does not explain the conditions found. If transmission of tubercle bacilli is by way of the lymphatics of the vas deferens, and if these lymphatics accompany the vas for its entire length, why should certain parts of this lymphatic path share in the infection more generously than other parts ? The writer states that he has seen no adequate explanation of this fact nor has he one to offer.

Malignant Tumours of the Testicle.—C. C. Higgins[10] reports in detail twenty-three cases of malignant tumour of the testicle. The discrepancy in the incidence of various types of tumour is due in part to varying methods of classification on the part of the reporters. Of the 23 cases reported by the author, 5 were carcinomata, 2 sarcomata, 5 teratomata, and 8 embryomata, and in 8 cases the type was not specified. In 16 of these there was no evidence of metastasis before operation, and the end-results are as follows: 6 patients are living, 1 six years and eight months, 1 five years and two months, and 1 one year and six months after operation and without any evidence of metastasis; 1 is living, with metastasis, five months after operation, and 2 were seen too recently for any report regarding them to be of value; 8 have died, and 2 have not been traced. Orchidectomy without extirpation of the lymph glands in relation to the testicle was the operation performed in the cases mentioned.

H. Dew[11] considers that only about 2 per cent of testicular tumours can be regarded as primary *sarcomata*. True sarcomata, however, do occur, and the writer reports several cases which illustrate the various pathological types. The sarcomatous tumours arise from the following tissues: (1) The mesoblastic elements of a teratoma; (2) The interlobular connective tissue of the testis and epididymis; (3) The coverings of the testis and spermatic cord; (4) Blood- or lymph-borne metastatic emboli. The first case, age 29, was an example of sarcoma developing in a teratoma. This tumour almost certainly originated in muscle fibres, scattered bundles of which were seen which in certain areas were in process of transition to form spindle cells. In the second case (age 67), as in the first, it was probable that the sarcoma was derived from the myogenous elements of a teratoma. In the third case, age 84, the neoplasm was either a bilateral primary sarcoma derived from the connective-tissue elements of the testicle, with secondary cutaneous metastases, or both the testicular and cutaneous tumours were metastatic and secondary to some other primary source. The latter is the more probable explanation. The fourth case, age 17, was a sarcoma of the retrotesticular tissues (*Plate LIX*) which the writer believed to be of myogenous origin; while the fifth, age 27 months, was in all probability a secondary sarcoma of the testicle resulting from metastasis, as the child had had a kidney the seat of an embryoma (Wilm's tumour) removed some six months previously. The five cases are reported in detail.

REFERENCES.—[1]*Jour. Amer. Med. Assoc.* 1927, ii, 2104; [2]*Lancet*, 1927, ii, 272; [3]*Jour. Amer. Med. Assoc.* 1927, ii, 2108; [4]*Surg. Gynecol. and Obst.* 1927, Oct., 557; [5]*Ibid.* 1928, March, 341; [6]*Ann. of Surg.* 1928, Feb., 257; [7]*Practitioner*, 1927, Oct., 211; [8]*Lancet*, 1927, ii, 367; [9]*New England Jour. Med.* 1928, April 19, 427; [10]*Ann. of Surg.* 1928, Feb., 263; [11]*Surg. Gynecol. and Obst.* 1928, April, 447.

TETANUS.

Joseph Priestley, B.A., M.D., D.P.H.

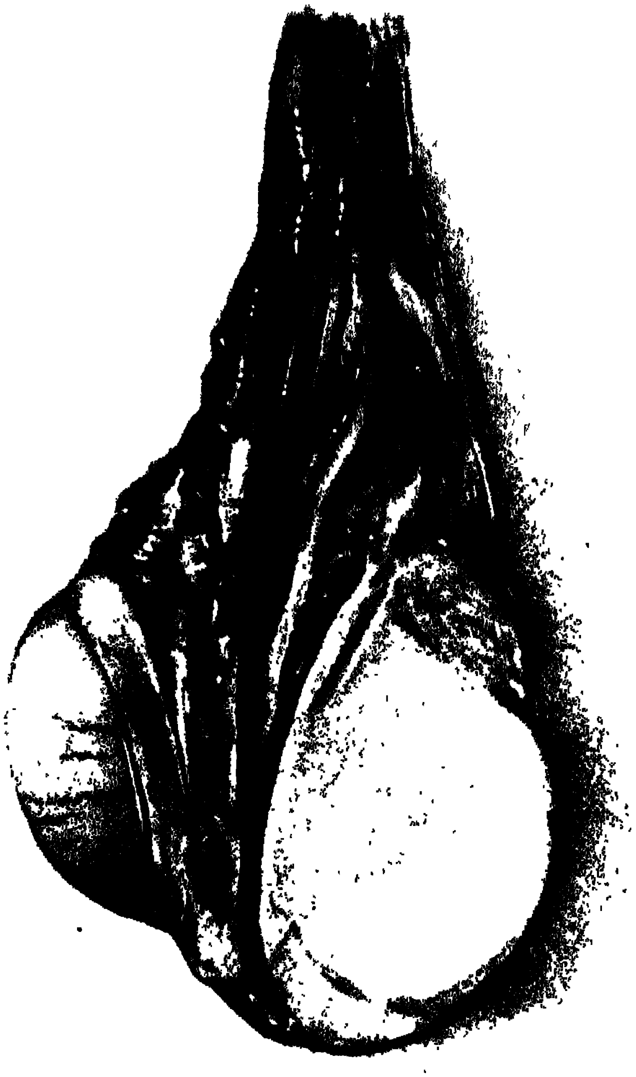
An interesting series of nine cases of tetanus has been recently traced to infected catgut used for gynæcological operations in a hospital. On inquiry, it has been shown that the infection was probably due to the ineffectiveness of the sterilizing or disinfecting methods used in the commercial preparation of the particular catgut concerned. Of the nine cases, eight terminated fatally. The germ of tetanus is of high resistance to disinfectants (iodine preparations or others that are generally used for the purpose of rendering the catgut sterile). Fortunately tetanus-infected catgut is rare, and now that attention has been drawn to the above-mentioned cases, extra precautionary measures will be taken, including the standardizing of disinfecting methods by the trade and the inclusion of surgical catgut within the scope of the Therapeutic Substances Act. All so-called sterilizers or disinfectants do not effect their object—they do not kill and destroy the germs and the toxins to which they give rise. In other words, they are not *true* germicides. This fact has often been emphasized, but, apparently, without general agreement, as far as the above cases of tetanus seem to indicate.

THORACIC SURGERY. (*See* CHEST, SURGERY OF.)

PLATE LIX

SARCOMATOUS TUMOUR OF TESTICLE

(H. DEW)



Fibroblastic sarcoma of retrotesticular tissues derived from gubernaculum testis. Slightly reduced in size.

By kind permission of 'Surgery, Gynecology and Obstetrics.'

THORACOPLASTY. (*See* CHEST, SURGERY OF.)

THROMBO-ANGIITIS OBLITERANS. *A. G. Gibson, M.D., F.R.C.P.*

S. Silbert and S. S. Samuels[1] have studied 124 cases of thrombo-angiitis obliterans by means of Pachon's oscillometer, which indicates the amount of pulsation in the limb at the level that the cuff is applied. They divide their cases into: (1) Those with positive oscillometer readings; in these there are three groups: those with pain, those with pain and ulceration, and those with pain, ulceration, and gangrene. (2) Those with negative oscillometer readings, in which they make the same subdivisions. Examination in this way frequently reveals pulsation when none is apparent to the finger. When examination shows pulsation at the ankle the prognosis for the relief of symptoms is good even though ulceration and gangrene be present. If there is no pulsation as shown on the oscillometer, the prognosis for saving the limb is worse the more the process in the limb is advanced. In addition to general hygienic treatment of the patient they used intravenous injections of **Hypertonic Saline.**

Henri Hartmann[2] reports a case of a man aged 63 who had had the left leg amputated some years previously. He complained of violent pains in the right leg and foot which required him to sit in a chair at night and have the foot hanging down. **Periarterial Sympathectomy** of the right femoral artery was successful in relieving the pain, and two years subsequently the patient is reported as remaining well.

E. V. Allen and H. W. Meyerding[3] from the Mayo Clinic give their experience in 45 cases that required surgical treatment, from removal of tonsils to amputation above the knee. The indications for amputation are not always clear, for medical treatment sometimes is successful in re-establishing function. Several cases of natural amputation of toes have been observed at the Mayo Clinic. This does not necessarily impair the function of the foot. For successful amputation of the toes there must be either a sudden thrombosis of the toe vessels, or the case must be one in which one or both of the main vessels of the foot pulsate. Amputation below the knee is not usually successful.

S. Silbert,[4] in a review of modern treatment, does not find the injection of hypertonic saline has supported the reputation it was thought to have a few years ago; 12 per cent of a series thus treated have come to amputation. He is of the opinion that the main etiological factor is smoking, and that cessation of this habit is the most important element in treatment. This affection is much more common in America that in Western Europe.

REFERENCES.—[1]*Jour Amer. Med Assoc.* 1928, i, 831, [2]*Bull et Mem Soc nat de Chir.* 1928, March 3, 272, [3]*Surg. Gynecol and Obst* 1928, Feb, 260. [4]*Jour Amer Med. Assoc.* 1927, ii, 964.

THROMBOPHLEBITIS. *A. G. Gibson, M.D., F.R.C.P.*

W. Stöhr and F. Kazda[1] have examined a large number of post-mortems in Vienna to ascertain what relation, if any, post-operative thrombosis bears to infection. They find that local post-operative thrombosis with detachment of a portion of the thrombus, and especially local and general septic infection, is characterized seldom by an advancing thrombus and massive embolism but frequently by infarctions. There is little difference in the frequency of post-operative, fatal embolism in thrombosis at a distance as between infected and non-infected cases. Local post-operative thrombosis without obvious pus formation leads in 87·5 per cent of cases to massive embolism and advancing thromboses, to the formation of which these cases tend. Detachment of massive portions of clot is in these non-infected cases almost six times as frequent as in the infected cases with local post-operative thrombosis.

T. G. Moorhead and L. Abrahamson[2] record 3 cases of a rare disease termed *thrombophlebitis migrans*, characterized by slight fever and recurrent attacks of phlebitis in various sites. The three cases here recorded were 55, 50, and 22 years of age respectively, and showed attacks of thrombosis in the upper and lower limbs; in the face; in the lung, producing pain and hæmoptysis; in the mesenteric vein, with collapse and melæna; and probably in a cardiac vein, with anginal symptoms and fibrillation. In one case there were eleven thrombotic episodes. The attacks were usually accompanied by mild fever, with partial recovery of health in between. No etiological factor could be identified, though in one case *Streptococcus viridans* was isolated from the gums. [The reviewer has recently seen a case which began with a sore throat; two thromboses had occurred in the leg and lung respectively, and in the throat *Streptococcus viridans* was abundant. - A. G. G.] No form of treatment was found that clearly influenced the course of the disease, but recovery occurred in all three. One case took two years to recover.

REFERENCES. [1] *Deut. Zeit. f. Chir.* 1928, Feb., 105; [2] *Brit. Med. Jour.* 1928, i, 586.

THYROID, THE.

W. Langdon Brown, M.D., F.R.C.P.

The Active Principle of Thyroid Secretion.—Harington's structural formula for thyroxin, involving four iodine atoms combined with a tyrosin derivative, is now generally accepted, but valuable as this work has been chemically, it has not been found that either natural or synthetic thyroxin has therapeutic advantages over thyroid extract. Indeed, J. Mouzon[1] believes that the difference between the therapeutic and toxic doses of thyroxin is so small as to make its use dangerous. He suggests that in the process of isolation it may undergo some change. Nor is it certain that thyroxin has all the properties of thyroid extract. For instance, Oswald finds that in contrast with thyroglobulin, thyroxin lacks the power of increasing the excitability of the vago-sympathetic system. Indeed, G. Scott Williamson, I. H. Pearce, and H. M. Cunnington[2] believe that there is a duality of function in the thyroid gland, the tissue in the phase of secretion being biologically inactive, while in the colloid phase it is biologically active. The method used was feeding tadpoles with portions of the gland in different phases. Thyroxin has two effects on tadpoles—it checks growth but initiates metamorphosis. The colloid tissue has this effect, but not the secretion tissue. Conformably with this the former always contains iodine, while the latter does not. Even when iodine was found in the cells of the secreting tissue, it was biologically inactive and therefore not combined as thyroxin. They therefore conclude that the gland contains or produces two distinct substances. Holst's feeding experiments agree with this view, and A. Troell,[3] using the azocarmine-Mallory method of staining, comes to the similar conclusion that there are functional differences in different parts of the same thyroid. We must admit, however, that we have no clear notion of the function of the secreting as opposed to the colloid tissue.

Iodine and the Thyroid Gland.—Many interesting observations have been made on the subject of iodine and the thyroid gland, and one thing that stands out clearly is that the routine administration of iodine as a panacea for thyroid troubles is very unwise. P. H. J. Turton[4] found that, on giving iodized sweets containing the equivalent of $\frac{1}{10}$ gr. of iodine as sodium iodide to a large number of school-children, any benefit derived was overbalanced by the considerable number of those whose goitres reacted unfavourably; 81 per cent of the girls developed goitre during the period of observation. A large number of goitres spontaneously decreased in size or disappeared entirely without the aid of iodine. He concluded that in many instances the goitres seen in childhood are nothing more than physiological swellings, and that it is an impertinence to interfere with them. Point is added to his observations by the fact that they were made at Heanor in Derbyshire, where goitre has been endemic for generations, though less severely so than it used to be. Yet the town water-supply contains more iodine than in any other part of Derbyshire. G. de Takats and D. Grey[5] came to similar conclusions from a survey of goitres among the students at the North-Western University. Whereas the percentage of definite thyroid enlargement in the women there was 26·5 per cent, in those who had taken iodine it was 43·4 per cent. In the history of medicine the widespread use of iodine has recurred several times. A form of 'chronic constitutional iodism' developed so frequently that in 1860 Rilliet published a book of warning on the subject. In 1900 Bilseer, of Nothnagel's clinic, gave a classic description of what he termed 'iodine Basedow'. Since then a large number of cases of hyperthyroidism induced by iodine have been reported, especially from the goitre clinics in America and Switzerland. Evidently iodine lack is not the whole story, though Oliver has made the ingenious suggestion that chlorination of drinking water by displacing the iodine in it may increase the liability to endemic goitre. On the other hand, R. McCarrison[6] has experimentally produced a type of goitre in animals by a diet of white flour with a normal supply of iodine, but without green vegetables or fruit. Adding iodine to this diet would not prevent goitre, but a diet rich in vitamins would. Bircher is opposed to the prophylactic use of iodine, and D. Marine[7] agrees that the indiscriminate use of iodized salt by the public has done much harm. He points out that the amount of iodine required for the prevention of goitre in man is exceedingly small --about 0·1 mgrm. daily—while the amount of iodine used in the treatment of goitre is fifty times greater than that recommended for prevention. Blum finds that the normal thyroid gland is tenacious of its iodine, and does not readily yield it up to the blood even when the latter is deprived of its alimentary supply.

H. B. van Dyke[8] has made an experimental comparison of the rates at which the hyperplastic thyroid gland of the dog absorbs various iodine compounds. Iodine as thyroxin is absorbed most slowly, free iodine next, iodate next, and iodide quickest of all. He concludes that there appears to be little experimental basis for the use of free iodine, even if loosely linked with iodides as in Lugol's solution, in the treatment of patients with various types of goitre. He suggests that the reason for the slow absorption of iodine, and especially of thyroxin, is that perhaps these substances are more or less selectively taken up by other tissues of the body. [But it seems to the reviewer, in the light of Blum's observations, that this may be after all the best way of correcting an iodine shortage, and that rapidity of fixation by the thyroid gland is not the best criterion. Distinct evidence of absorption within ten minutes, as in these experiments, is probably far removed from the normal processes of iodine metabolism, and such experiments cannot dispose of the clinical evidence that iodine is much more easily tolerated than iodide.—W. L. B.] H. M. Clute and R. L. Mason,[9] and Clute and Morrison, conclude, on the other hand, that it does not matter what form of iodine is given. [As will appear later, surgeons have almost unanimously come to the conclusion that both before and after operation in Graves' disease the careful administration of iodine is of great value.—W. L. B.]

Toxic Adenomata.—As to the value of **Iodine** in toxic adenomata of the thyroid, there is more difference of opinion. Clute and Mason think that it may be cautiously tried in the preparation of such patients for operation. L. Bérard and C. Dunet[10] believe that toxic adenomata respond better to quinine and much less to iodine than true Graves' disease. In a later paper[11] they stress the risk of converting a simple into a toxic goitre by over-treatment with iodine. They consider that the syndrome of Graves' disease when no gland enlargement can be felt may be due to deep-seated toxic adenomata, and call attention to the comparative slightness or absence of exophthalmos and the absence of gastro-intestinal crises in such cases as opposed to their frequency in true Graves' disease. They strongly advocate operation in any cases resistant to medical treatment. L. Dautrebande and A. Lemort[12] also emphasize the probability of the presence of toxic adenomata where there are symptoms of Graves' disease with an increased basal metabolic rate without obvious enlargement of the thyroid. J. B. Youmans and R. H. Kampmeier[13] found that the response to treatment with iodine in thirty unselected cases of toxic adenoma previously untreated with this drug was essentially the same as that seen in unselected cases of exophthalmic goitre. Whatever differences exist are apparently quantitative, and not qualitative. With this Graham and Butler agree.

As to the *genesis of toxic adenomata*, T. P. Dunhill's[14] views are illuminating. Physiological enlargement at puberty should later undergo involution. If Graves' disease occurs after such involution is complete, the whole gland can become changed into the solid cellular organ of the primary form of this disease; but if such involution has not occurred, i.e., if there is an early colloid goitre, such parts of the gland cannot undergo this change. Both conditions are Graves' disease, but the latter is transitional to the toxic nodular goitre. In the case of a woman who has had goitre for years, if the factors causing Graves' disease come into action, only small and scattered areas in this old fibrotic goitre can respond, and these form the toxic adenomata.

Basal Metabolic Rate.—Despite adverse criticisms, the estimation of the basal metabolic rate continues to be relied upon as a valuable guide in diseases of the thyroid. It is surprising how little other endocrine conditions disturb the rate compared with alterations in this gland. That sometimes the basal metabolic rate may be markedly increased in other than thyroid disease is illustrated by a case of melanotic sarcoma with extensive involvement of the liver which had an average rate of + 42·8 per cent, although the thyroid was not involved (E. H. Mason[15]). The reviewer has had two cases of virilism in women with increased basal metabolic rate without thyroid involvement. In general, however, the above statement remains true.

A. Topper and H. Mulier,[16] repeating Holmreich's observations, confirm his conclusion that the rate is independent of body surface, but rather depends on the amount of active protoplasmic tissue. They applied to themselves the method of cutting off the lower extremities from the general circulation by ligation, and found that the basal metabolic rate was diminished in an amount which roughly corresponded to the mass thus secluded and not to surface area. On removal of the ligature the level of the rate returned to normal. As the determination naturally offers difficulties in some cases, attempts have been made to find out how far other changes may be accepted as evidence of an altered basal metabolic rate. A few years ago Eason showed that an increased pulse-pressure in Graves' disease often runs parallel with an increase in this rate. J. H. Smith[17] emphasizes the value of an increased pulse-rate as evidence of an increased basal metabolism. H. L. Segal and others[18] have shown that the basal metabolic rate does not go up on the morning of operation in Graves' disease if the patient has been adequately iodized; a rise suggests that an insufficient amount of iodine has been given.

Exophthalmic Goitre.—Scott Williamson believes that the *relationship of the thyroid and thymus* is important in this disease, as might be deduced from their lymphatic arrangements. The presence of an enlarged thymus has long been known to be an almost constant concomitant of Graves' disease, and this thymus has enormously dilated capillary sinuses. He regards the thymus as a detoxicating mechanism for the thyroid, and recalls Bircher's experimental production of Graves' disease in animals by grafting portions of thymus removed from patients with exophthalmic goitre. He believes that the relationship between these glands (and it will be remembered that both are derived from gill slits) may throw light on the nature of status lymphaticus.

Juvenile Exophthalmic Goitre.—This is so rare that two cases described by A. B. McGraw[19] are of interest. These patients were 6 and 7 years of age respectively, and most of the cases described have been in patients between the ages of 6 and 10 (i.e., the time of active involution of the thymus). The disease runs a similar course and has similar symptoms to those in adults, but if operation is performed a larger amount of the gland should be left.

Secondary Symptoms of Graves' Disease.—J. W. Hinton[20] emphasizes the following: restlessness, irritability, emotional instability, vasomotor disturbances, including diminished sensitiveness to cold, palpitations, increased appetite, amenorrhœa or impotence, muscular fatigue, sweating, vague pains in the extremities, hoarseness, falling out of hair on small areas of the scalp, and pigmentation of the skin. But he does not mention diarrhœa or glycosuria, both of which are fairly common. Gardiner Hill has also pointed out that, contrary to the common belief, amenorrhœa is associated with hyperthyroidism, and menorrhagia with hypothyroidism. In connection with these secondary symptoms it may be mentioned that Murray B. Gordon[21] has described five cases of stammering following overdosage of thyroid extract. He considers them as a manifestation of a general nervous excitation following disturbance of the central nervous system. D. Maselli[22] calls attention to the hypersensibility to adrenalin in Graves' disease as shown by Goetsch's test.

Surgical Treatment of Graves' Disease.—Every year opinion leans more to the advisability of surgical treatment in Graves' disease. C. A. Elliott,[23] advocating **Subtotal Thyroidectomy** for hyperthyroidism *before* visceral damage is done, states that it is still of value, enabling most patients to return to their previous occupations, even after a prolonged period of hyperthyroidism, though in that case considerable residual damage may be evident. [The reviewer has during the past year advised operation in two cases of this kind, with successful results, although the patients were both aged about sixty and were in a state which a few years ago would have been held to contra-indicate operation.—W. L. B.] Yet A. Troell[24] holds the remarkable view that if medical treatment does not improve basal metabolic rate, body-weight, and tachycardia within four weeks, the case is so highly toxic as to exclude the possibility of a good result from operation.

Dunhill[14] considers as indications for operation: (1) The development of disturbing features while under medical treatment, such as corneal ulcer, glycosuria, fibrillation. When fibrillation has been established or congestive heart failure has occurred, the question has ceased to be arguable; without operation the patient is doomed to invalidism. (2) The economic factor. A patient who has to earn her living may be stabilized by operation to a degree impossible by medical means alone. He believes that the operation can be made safer by cleaning up septic foci, by preliminary rest in bed, by iodine medication, by confidence between surgeon and patient, and by adjusting the amount done at one operation to the patient's strength. In other words, the surgeon should not attempt to do too much just because the primary operation is the easier. The patient should know that a second operation will probably be needed. He does not believe in Kocher's operation of the removal of one lobe with the isthmus and ligature of an artery on the other side. The remaining lobe is bigger than the whole normal gland and is very toxic. He believes that, though the exophthalmos may be the last symptom to clear up, improvement in this respect may be promised.

A. J. Walton,[25] in a judicious review of the subject, advocates careful medical treatment before operation, and believes that **Digitalis** or **Quinidine** may temporarily restore normal rhythm in auricular fibrillation, while **Operation** may permanently cure it. He regards X rays as showing a remarkably selective influence as between simple hyperthyroidism and carcinoma of the thyroid, believing them to be of real service only in the latter. With this view most authorities are in agreement, though W. H. Meyer[26] advocates X-ray treatment in adolescent goitre and even as a preparation for operation. [The reviewer definitely dissents from both these statements, and is convinced that irradiation adds materially to the surgeon's difficulties.—W. L. B.] Walton does not like to operate during very hot weather, as such patients are very sensitive to heat. He gives **Rectal Salines** for several days three-quarters of an hour before the time at which operation will ultimately be performed. Then on the day of operation he replaces this by 3 oz. each of **Olive Oil** and **Ether**, continuing the anæsthesia with a small amount of open ether. The rectum is washed out again as soon as the patient is returned to bed, and restlessness is controlled by **Morphine** and **Atropine.** Water is given per rectum as soon as the patient is conscious, followed by plenty of liquid by the mouth.

T. P. Dunhill[27] thinks that **Rectal Ether** is a good anæsthetic, but that in cases of fibrillation **Local Anæsthesia** is essential. Properly carried out it gives a comfort in working and a freedom from bleeding which are attained in no other way. He regards chloroform anæsthesia as dangerous (Walton says it should never be used, as it is almost a specific poison), while ether tends to increase the bleeding. He sometimes used **Endotracheal Ether,** and considers **Nitrous Oxide with Oxygen** a most valuable anæsthetic. It would appear, however, that local anæsthesia is gaining increasing advocacy. Walton does not give iodine as a routine after operation unless there is a marked reaction. [At St. Bartholomew's Hospital we usually employ iodine both before and after operation, while insulin is frequently given before.—W. L. B.] Walton distinguishes (1) a stage of reaction three to four days after operation ; (2) a stage of primary improvement within a fortnight ; (3) a stage of primary relapse for about four to six weeks on returning home ; (4) a stage of apparent cure in which patients lose all their symptoms after a few months, but during which they may relapse under shock or strain. After one to two years the cure is apparently complete, and they seem able to face all ordinary disturbances without fear of recurrence.

Among other papers on the surgical treatment of Graves' disease may be mentioned that by P. K. Gilman and W. E. Kay,[28] who advocate **Total Thyroidectomy** (taking care to leave the parathyroids), believing that the whole gland is diseased and that the remnant will cause a relapse. The patient's thyroid balance is then maintained by giving **Thyroid Extract** in doses regulated by the basal metabolic rate. They report a series of twenty-two cases thus treated, all successfully. They maintain that the improvement in the decompensated cardiovascular cases was most gratifying ; but the majority of surgeons will probably prefer the more usual method of removing only five-sixths to seven-eighths of the gland.

A. S. Jackson[29] emphasizes the great value of **Iodine** in the preparation of patients for operation. He inclines to Plummer's view that digitalis should not be used then, yet apparently gives tincture of digitalis three times a day for three days, recognizing that the clinical experience of others favours this course. He also gives as much as a drachm of tincture of iodine in the day, with a liberal diet containing as much as 4000 calories, while restricting tea and coffee. He does not starve the patient on the morning of operation, holding that if iodine and food are withheld for several hours, metabolism will be greatly increased and that acidæmia may occur. To guard against this latter contingency he gives 200 grm. of **Dextrose** with **Orange Juice.**

F. H. Lahey[30] is not in favour of routine draining after thyroidectomy. He maintains that thyroid reactions following operation are no more frequent or severe in the absence of drainage, and that drainage is only necessary to neutralize the effects of uncontrolled oozing, to eliminate dead spaces in which blood may pool and become infected, and to protect the superior mediastinum against infection. Should drainage be decided upon for any of these reasons, he advises that it should be carried out through the angle of the wound, and not through a stab wound, which inflicts an additional and often obvious scar. [It is probably true that drainage is unnecessary if the conditions are such that very great care can be given to hæmostasis. But some patients are too ill for the necessary time to be justifiably spent on this. W. L. B.]

Injury to the recurrent laryngeal nerve is an accident which may occur during operation, and F. H. Lahey[31] has described a technique with Ochsner's clamps to avoid this, and also damage to the inferior parathyroid body during removal of adenomata.

In the opinion of A. S. Jackson[32] *chronic post-operative tetany* is commoner than it was, because of more radical operation. He finds that **Parathormone** helps in its treatment, but is not a cure. He relies chiefly on a diet rich in calcium, prevention of constipation, and plenty of sunshine. L. Jacques[33] reports two cases and has collected thirty-four others of bilateral cataract developing in the course of post-operative tetany, as a rule within two years of operation. He calls attention to the relative frequency of this, and of changes in the hair and nails in tetany, whether post-operative or not. The same thing has been noted in experimentally parathyroidectomized dogs. He thinks the condition may be due to deposit of calcium, and finds parathormone of doubtful value in its treatment. Evidently prevention of tetany by avoiding damage to the parathyroids at the time of operation is the only satisfactory way of preventing this serious sequela. J. E. Else[34] notes a tendency to regeneration of the gland after operation, and believes that this can be controlled by giving **Iodine** both before and after. [There is evidently a decided consensus of opinion in favour of this course.—W. L. B.]

As to the *results of operation* in exophthalmic goitre, the following figures may be quoted. Walton states that, with a mortality of about 5 per cent, sufficient relief for patients to earn their own living may be expected in 81 per cent. In 100 cases from the Lahey Clinic[35] followed up for a year or more, complete relief was claimed in 92, and the remaining cases were much improved. Signs of myxœdema developed in 15; this higher figure is probably due to removal of larger amounts of the gland than formerly. The presence of acidophilic cells in hyperplastic thyroids appears to be connected with the development of post-operative myxœdema. Like Else, they advise **Iodine** after operation to prevent hyperplastic regeneration. Dunhill's mortality-rate is 2·8 per cent. C. H. Frazier and W. B. Mosser[36] urge early operation, claiming that it then offers a chance of recovery in about 96 per cent, and that the degree of permanent disability is proportional to the duration of the disease. In contrast with these results, H. T. Hyman and L. Kessel[37] give an immediate mortality-rate of 11 per cent and a total mortality of 19 per cent. In an earlier paper[38] they state that considerably more than half of the patients suffering from Graves' disease spontaneously acquire social and economic restitution after the fourth month, and will continue to improve at least up to fifty-seven months. [A total mortality of 19 per cent after operation for a condition from which more than 50 per cent spontaneously recover would seem to us completely to condemn the operation, but we do not observe that they draw this obvious conclusion, and we do not think it accords with the general experience.—W. L. B.]

Malignant Disease of the Thyroid.—J. de J. Pemberton[39] finds that the frequency of malignant disease of the thyroid, compared with benign nodular tumours, is as 1 to 36·7, and compared with all benign enlargements as 1 to 60. He thinks that malignancy should be suspected in cases of rapid growth with or without associated hoarseness and paralysis of a vocal cord. Sarcoma is the most malignant type. **Operation** supplemented by **Radium** is the treatment of choice. In all cases in which new growth was diagnosed before operation 32 per cent were alive three or more years later. U. V. Portmann[40] comes to the same conclusions as to treatment and its results. Of his cases 36·6 per cent were alive at the end of three years, and 22·6 per cent at the end of five years. E. M. Eberts and R. R. FitzGerald[41] find that better results may be anticipated from radium when malignancy is recognized before metastases occur, and from the more frequent and early removal of nodular goitres. When a malignant tumour of the thyroid has infiltrated surrounding structures, or there are glandular metastases, there is naturally little hope of cure.

M. B. Tinker[42] states that, though goitres as a whole are commoner in women, new growth of the thyroid is more frequent in men. In young adults, thyroid growths so small that some have not been thought of much significance, if fixed, hard, nodular, and of rapid growth, especially if hoarseness and obstructive symptoms are beginning, have proved to be malignant in more than half the cases in which they have been excised. The wasting in these malignant cases is not so rapid as in Graves' disease, which may prove misleading. He is in favour of **Partial Operations** followed by treatment with **Radium.** Too radical surgery undoubtedly accounts for the high death-rate reported by most writers.

R. Alessandri[43] has reported an interesting series of cases of thyroid and parathyroid tumours in bone without any primary lesion in the thyroid gland.

Cervical Sympathectomy for Toxic Goitre.—Cunliffe Shaw[44] makes a rather astonishing plea for this operation. He claims that it is followed by a fall of the basal metabolic rate below normal and diminution of tremor, though the exophthalmos remains unchanged. [It is difficult to understand this, since one would have supposed that this operation, if ever applicable, would have applied to cases where the nervous rather than the toxic factor predominated, though one must admit that these two factors form a vicious circle. One would have supposed that as the cervical sympathetic is running upwards from the roots of the 2nd and 3rd thoracic nerves, this operation would have divided it above the point at which it supplies the thyroid gland, though below the point at which it supplies the eye. The admitted failure of the operation to relieve exophthalmos adds point to Foster Moore's view that the cause of this symptom is not vascular, but an accumulation of fat in the orbit behind the globe of the eye.—W. L. B.]

The Thyroid Gland in Infections.—W. H. Cole and N. A. Womack[45] have produced lesions in the thyroid gland experimentally by infections and other toxic processes which greatly resemble the microscopic appearances seen in exophthalmic goitre and toxic adenomata in man. They consider that this strongly suggests that the thyroid gland takes an active part in the defensive mechanisms against infections, as previously urged by Cramer. Since the iodine content of the gland is so markedly reduced during acute infections, it seems to them logical to give **Iodine** at such times.

E. Obermer[46] adopts the view that it is the function of the catabolic group of endocrine glands—the glands of emergency (the thyroid, adrenal medulla, and posterior pituitary)—in association with the sympathetic nervous system to react to acute infections, and of the anabolic group—the glands of conservation of energy (the parathyroid, adrenal cortex, thymus, and anterior pituitary) [and, he might have added, the pancreas]—in association with the parasympathetic to counterbalance the prolonged overaction of this metabolic group in 'chronic' infections. He goes on to claim that in chronic pulmonary tuberculosis improvement is dependent on the predominance of the anabolic group, and brings forward evidence to show that in the hard fibrosing type of lung the histological picture of the ductless glands is relatively normal, while in the cases where the lungs are soft, and where there is laryngeal and intestinal ulceration, this picture is one of extreme dysfunction. The successful resistance to a tuberculous invasion is dependent on the integrity of the endocrine system. In the unfavourable cases one finds chemically a high serum phosphorus with a low phosphate excretion and a high excretion of calcium.

Myxœdema.—There is nothing new to report under this heading. The familial tendency to this condition is emphasized by P. Sainton,[47] who relates a case of myxœdema in a woman whose father, sister, and niece were all hypothyroidic.

The Geographical Distribution of Goitre.—P. Stocks[48] shows that the ratio of girls to boys affected by goitre is higher in areas where goitre is less common, while in areas of high prevalence the sexes become equally affected. Country districts are affected more than urban. Towns actually on the coast have lower rates than inland towns; but there are exceptions. There is a high incidence in a belt extending from Cornwall north-east through Somerset, between the Cotswolds and Chilterns up into Derbyshire, and on to the Pennines, with offshoots from this belt. Another small area exists in Kent and Sussex. The zone between 500 and 1000 feet above sea-level is most affected. [But surely the population at 1000 feet in England must be very small.—W. L. B.] Stocks finds that the highest incidence is where the strata of Devonian, triassic, or carboniferous limestone are outcropping.

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TONGUE, CARCINOMA OF. (*See* PHARYNX, LARYNX, AND TONGUE, CARCINOMA OF.)

TRACHOMA. (*See* CONJUNCTIVA, DISEASES OF.)

TRYPANOSOMIASIS. *Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.*

ETIOLOGY.—The frequency of direct infection from man to man, and indirect after cyclical development in tsetse flies of trypanosomes derived from animals, is still disputed. W. H. Dye[1] records careful observations of a local outbreak of *rhodesiense* infection in Tanganyika Territory, in which he came to the conclusion that the infection was directly from man to man, and the incubation period was probably two or three months. He therefore advocates the employment of inspectors with limited areas of villages to report illness and deaths to the medical officer, who will then be able to find the cases early, and segregate and treat them, with great reduction of the foci of infection, with a view to controlling the spread of the disease. [This plan is very similar to that adopted with success in kala-azar in Assam.—L. R.] I. J. Kligler and G. Rabinowitch[2] have tested the influence of the number of trypanosomes injected into rats in relation to the subsequent course of the disease, and they found that both the incubation period and the duration of the disease were greatly reduced when very large numbers of trypanosomes were injected, such as increases of one thousand-fold. I. J. Kligler[3] has also investigated the resistance to infection found in animals cured of trypanosomiasis by the use of **Bayer 205,** and found it was not specific, nor was it transmitted to the offspring of the animals, and it is temporary in duration; so he considers it is not a true immunity, but it is refractoriness to infection resulting from the interaction of the drug and the host. L. J. Davis and H. C. Brown[4] report on an *adhesion phenomenon* of blood-platelets to trypanosomes in the blood of rats, which had recovered from an infection, in the presence of blood plasma, but not of blood serum, and they have confirmed the specific nature of the reaction for both species of trypanosomes and for spirochætes; they found the specific antibody present in serum as well as in plasma. They suggest that the reaction may be of use in the diagnosis of trypanosomiasis and in the discovery of game reservoirs in Africa, and they propose to call it 'the adhesion phenomenon'. A. L. Duke[5] records observations of the longevity of *G. palpalis* after infection with trypanosomes, but was unable to confirm his impression that infected flies lived longer than uninfected ones. J. F. Corson[6] records a case of *rhodesiense sleeping sickness* in a European in Tanganyika Territory with an incubation period estimated at under one month. He recovered under Bayer 205 and tryparsamide without being sent home, and has remained well for eighteen months.

TREATMENT.—A. J. Keevill[7] records six cases of *rhodesiense* infection treated in 1925 with **Bayer 205** or **Fourneau 309** with lasting recovery, in spite of three of them having trypanosomes in the cerebrospinal fluid; showing that in early spinal infection these drugs may be effective. C. C. Chesterman and K. W. Todd[8] report on the use of several organic arsenic derivatives in human trypanosomiasis in the Upper Belgian Congo. Stovarsol orally has only a slow and transient action. **Tryparsamide Base,** of which tryparsamide is the sodium salt, can be given in tablet form, and it has been found to cause the slow disappearance of trypanosomes from the blood and cerebrospinal fluid of patients, while it does not produce optic neuritis; about twice the dose for injections is required, which makes it more expensive. In four cases, after initial smaller doses, up to 0·15 grm. per kilo. was tolerated, and all showed clinical and pathological improvement without toxic symptoms other than slight diarrhœa and sickness, but progress was slow, and in two cases injections of the sodium salt were given later. Cyclosan, a new pentavalent arsenical preparation, which is actively trypanocidal in animals, was found to be too toxic for use in man. The elimination of arsenic in the urine after injections of tryparsamide has been investigated by Ferré,[9] who concludes that it is very rapid during the first few minutes and hours after injection, and is usually completed in twenty-four to forty-eight hours. Ch. Joyeux[10] gives a summary of recent advances in the treatment of trypanosomiasis.

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TUBAL PATENCY.

Beckwith Whitehouse, M.S., F.R.C.S.

The demonstration of tubal patency, either by inflation or the injection of iodized oils, as a method of diagnosis in chronic salpingitis and other causes of sterility, continues to engage the attention of gynæcologists. The value of both methods has been clearly demonstrated, and there appears to be no doubt that as diagnostic procedures they have come to stay. I. C. Rubin,[1] in a clinical study of 650 cases of sterility, records his observations upon the results of recent developments. According to this author the addition of manometric and volumetric control has made it possible to elicit diagnostic data that must escape the simple unaided introduction of gas through the uterus and tubes into the peritoneal cavity. By attaching a kymograph to the original apparatus Rubin has studied the question of normal tubal patency and peristalsis, and has endeavoured to ascertain whether additional light may be thrown on the causation of tubal block by stenosis, stricture, or spasm. In the case of normal patency Rubin found that a normal variation exists in relation to the menstrual cycle. The menstrual phase is a definite factor in influencing the pressure rise, and the post-menstrual interval is the most favourable time for performing uterotubal insufflation. Greater pressures are required for the gas to pass through the tubes in the pre-menstrual phase. Small pressure fluctuations readily recorded by the kymograph are produced in the healthy tube by peristalsis. These are totally absent where the tubes are occluded. In the author's 650 cases, pressure of from 90 to 100 mm. of mercury was taken to represent the limit of normal resistance at the uterotubal junction from isthmic tonus. The ampullary portion of the tube does not offer any resistance to the gas in non-functioning tubes, and pressures greater than 100 mm. may therefore be taken to indicate abnormalities in the tube lumen. In Rubin's cases 4 per cent showed well-marked spasm, and in 5·5 per cent there was a high-grade stricture; 38·5 per cent were totally non-patent.

It is interesting to observe that when the gas enters the peritoneal cavity, changes in intra-abdominal pressure can also be recorded. For example, if a non-anæsthetized patient is asked to bear down, there is a simultaneous rise in pressure if the gas has succeeded in entering her peritoneal cavity. On the other hand, when the gas passes through partially closed tubes, the initial pressure being of 160 to 200 mm., there would be no fluctuations.

In the case of spasm at the isthmic portion of the tube the initial pressure commonly rises at once to from 150 to 180 or even 200 mm. It then falls to 140 mm., either in a gradual descent, or sharply, when fluctuations more or less typical are exhibited.

REFERENCE.—[1]*Jour. Amer. Med. Assoc.* 1928, i, 99.

TUBERCULOSIS OF BONES AND JOINTS. (*See also* SPINE.)

John Fraser, Ch.M., F.R.C.S.Ed.

Tuberculosis of the Hip.—A. de Forest Smith and W. H. Watters[1] discuss the case-histories and progress of 208 cases of hip-joint disease in a study extending over the period 1904–21, the cases being resident under the best general conditions in the Country Branch of the New York Orthopædic Hospital. One of the most impressive points of the study arises in connection with diagnosis.

We read that in 46 cases the diagnosis was in error—a finding which amounts to 22 per cent. We agree with the statement that it is unwise to institute fixation treatment until the diagnosis of tuberculosis is fully established. To do so is to arrive at a situation in which it may never be established, for the limitation of movement which results from the fixation further confuses the issue. We find it difficult, however, to approve of the further statement that "no hip, or in fact any other joint, is now treated for tuberculosis in this clinic until the diagnosis has been proved either by aspiration and guinea-pig inoculation or by exploratory incision". We believe that a careful estimate of the clinical and radiological findings is usually sufficient to enable one to arrive at a positive diagnosis. Excluding cases of doubtful diagnosis and those which had been under treatment for a period of less than three years, a total of 138 remained, which were submitted to a critical analysis of the prognosis. The mortality was 24 per cent; this seems a large figure, yet we believe it is an accurate representation of events. There are few who appreciate how high is the ultimate mortality when a major joint is affected by tuberculosis, and it is only by the survey of cases over a long period of time that this truth can be brought home to us. In 47 per cent of the cases the disease remained active for over three years, and in those cases which were apparently cured, relapse occurred in 13 per cent. The average age of the children under treatment was 6·4 years, and the average total duration of treatment was 7·3 years—an impressive index of the patience which the disease demands.

TREATMENT.

Sympathectomy.—A. L. Floresco[2] reports the results of the procedure of **Sympathectomy** in a paper which is in some respects a continuation of that which he contributed in the *Clujul Medical* of September, 1922, p. 279. He claims that the procedure is a powerful stimulant of tissue activity and therefore of reparative function. It is true that it cannot undertake to obliterate a cavity, but it induces the two conditions so essential for cure—the mobilization of the osteoblasts and the increase of the vascularity of the connective tissue. The sequence of events following the operation is probably—sympathectomy, congestion, re-absorption of bone (rarefaction), a phase of condensation, and bone formation. Even in cavity formation, if the space is reduced by operative measures, the reaction of the parts is stimulated by sympathectomy.

Certain principles have become established as the result of a long series of investigations: (1) Sympathectomy does not exclude other means of treatment—it reinforces them; (2) Immobilization or any indicated operative measure must always be employed; (3) With these considerations the indications for sympathectomy are frequent.

We find five groups of indications for the operation: (1) To shorten the period of immobilization and accelerate cure in superficial and infiltrating forms of disease without distinctive central lesions; (2) To favour the employment and to perfect the result of simple excision operations, whether followed or not by bone-grafting; (3) To aid the tissue reaction after an excision operation; (4) To extend the field of action of operation in severe cases up to the limit of amputation; (5) To benefit cases in which sinuses open spontaneously and empty an underlying bone cavity—in such cases sympathectomy is often followed by most impressive results.

The contribution strikes one as being essentially reasonable and well balanced. No extravagant claims are put forward, and those who have had an opportunity of seeing Professor Leriche's work in Strasburg will confirm the view that many examples of chronic infection benefit from the procedure of sympathectomy.

Orthopædic Principles.—Ernst Bettmann[3] gives a series of six vital rules for the treatment of bone and joint tuberculosis: (1) Diagnose early; (2) Rest the diseased area; (3) Instal a definite plan of fixation with or without extension; (4) Avoid any drastic correction of existing deformity until cure is complete; (5) Exercise caution in any form of local treatment; (6) Empty a cold abscess early and completely.

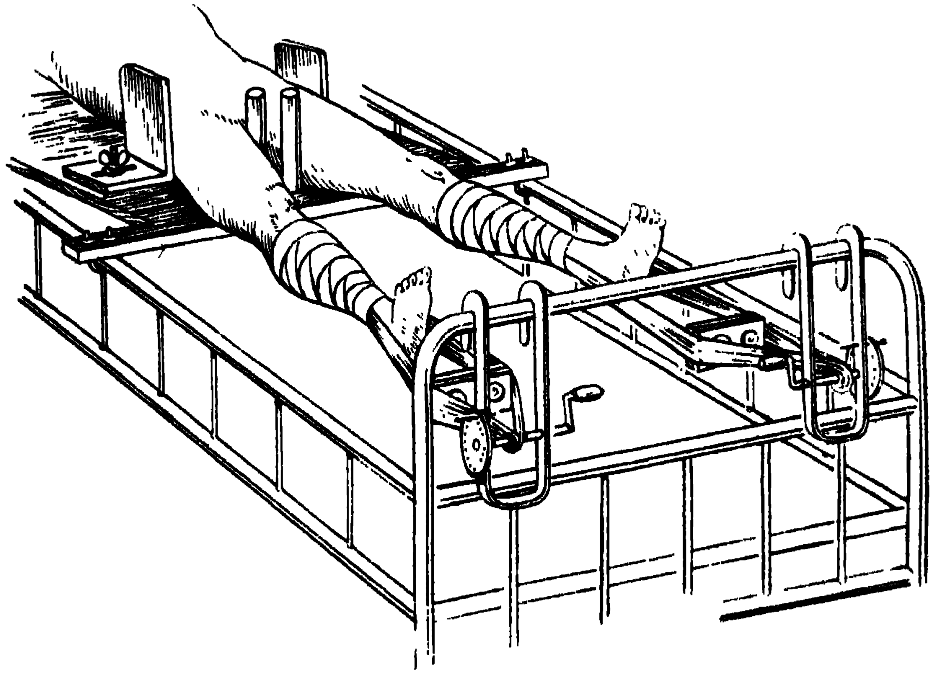

Fig. 87.—Extension apparatus recommended by Bettmann in early cases of tuberculous disease of hip and knee.

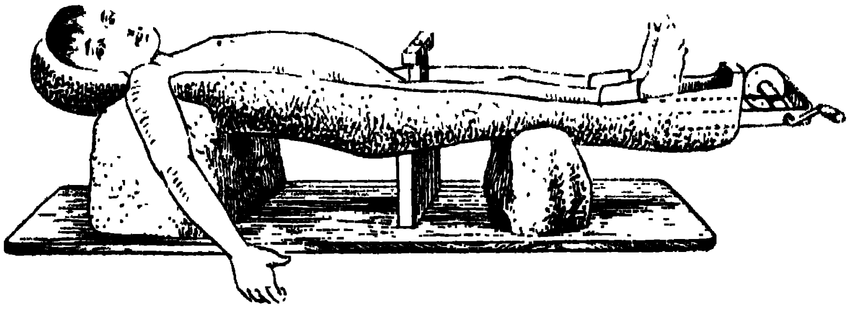

Fig. 88.—Bettmann's plaster-of-Paris bed, fitted upon Pará rubber supports, for the treatment of Pott's disease. (*Figs.* 87, 88 *re-drawn from 'Münchener medizinische Wochenschrift'.*)

Under *diagnosis* he discusses the well-recognized local distinctions, and indicates several points not generally recognized. In hip-joint disease he attaches importance to thickening of the subcutaneous tissues overlying the joint, and he recognizes inability to hyperextend the thigh as a valuable early sign of disease. In spondylitis he attempts to produce a rotatory movement of the suspected vertebra by grasping the tip of the spinous process between finger and thumb and attempting to move it laterally. Other early signs of spinal disease are convergence of the ribs in the neighbourhood of the affected area, and a deficiency of calcium in the bones above and below the suspected area. Bettmann is sceptical of the value of complement deviation and tuberculin tests, and pins his faith to the biological test of animal inoculation.

The carrying out of Rules 2 and 3 (the securing of rest, fixation and extension) permits of considerable personal choice of ways and means, and recognition of the fact that different types of cases demand different means. Extension is particularly recommended in early cases of hip and knee disease, and a figure is shown of the appliance used for this purpose and adaptable for either condition (*Fig.* 87). Pott's disease is invariably treated by a plaster-of-Paris bed fitted upon Pará rubber supports (*Fig.* 88).

In considering Rule 4 (the avoidance of too early correction of deformity), it is stated that deformity, and even stiffness, can be avoided if means are taken to secure sufficiently early and complete fixation.

The author is not enthusiastic about any special type of local treatment. He believes that **X Rays** are beneficial in stimulating the calcification of bone, and he favours the use of **Klimmer's Tuberculin Vaccine**; but **Fresh Air,** and a plentiful, varied, and fat-containing **Diet** form the basis of the more general scheme of treatment.

Treatment by Iodoformosol.– Iodine in one form or another has long been a favourite remedy in the treatment of tuberculosis, being supposed to exert a solvent influence on the wax capsule of the bacillus. Two years ago Dr. Kuhn introduced a preparation under the name of **Iodoformosol,** and this is now reported upon by W. Markert,[4] of Würzburg. The preparation is a colloidal one, readily solvent in water. It is employed in a dilution of 1–25, and should be freshly prepared for use on each occasion. A great variety of tuberculous cases (97 in number) was submitted to treatment. The application was made to open surfaces, by injection of fistulæ, and into abscess cavities, glands, and caseous collections. When injection was made into a closed space a quantity of 10 to 30 c.c. was used for adults and 10 to 15 c.c. for children. The injection was repeated each week, and three or four doses were the average number required. The results recorded are interesting. They were most encouraging in examples of closed cavities and in glandular areas; they were moderately successful in open surfaces; they were evidently disappointing in fistulous conditions. It may be that the presence of a superadded infection is the factor which vitiates the result in certain situations, for it was in conditions where mixed infection existed that the results were most disappointing. The preparation is evidently a safe one, for the absence of any toxic symptoms following its use was a noticeable feature, and, while the therapeutic benefits may not be materially greater than those of certain other preparations, the comparative safety of this drug is a great advantage.

Treatment of Cold Abscesses with Chloroform-Iodine.—Marian[5] has had excellent results from the use of a **Chloroform-Iodine** solution made up as follows:—

℞	Metallic Iodine	6 grm.	Guaiacol	10 grm.
	Oleum Amygdalarum	40 grm.	Chloroform	60 grm.

The mixture is sterilized and stored in the dark in blue glass bottles.

The technique of injection implies preliminary emptying of the abscess and the immediate injection of the special fluid from a second syringe. The amount used is proportionate to the size of the abscess and the age of the patient; in children under five years the amount should not exceed 2 c.c.; in adults a total of 10 c.c. may be employed. The injection is repeated every fifth day, and three or four doses are usually sufficient to obtain a cure. If the abscess is superficial, the injection should be repeated at more frequent intervals—every second or third day. Collections of caseous matter are treated by the injection of 2 to 4 c.c. every second day until the accumulation is sufficiently fluid to permit of complete aspiration. Fistulæ are treated by the injection of a few c.c. of the solution every second day. It is important that the fluid shall not penetrate the surrounding healthy tissue, as an intense irritative reaction will certainly develop. Should such a complication arise, it is treated by the application of hot fomentations. Symptoms of iodine poisoning may follow the injection of too large amounts or the too frequent repetition of the injection, or in individuals with an idiosyncrasy for iodine. Marian has employed the method in 97 cases, and no failure is recorded. In four instances the abscess cavity contained 200 to 300 c.c. of pus.

Treatment of Osteoperiosteal Cold Abscesses.—Capellini[6] records his experience in seventeen cases of tuberculous abscess arising in connection with bone foci treated by local injection of **Ioduretted Iodine** (Durante's solution). The injection is made under most careful aseptic conditions. Using a 10-c.c. syringe and hollow needle, the abscess cavity is entered and emptied as far as possible. If the caseous nature of the pus renders aspiration impossible, it is not persisted in. The injection is then made in an amount depending on the size of the cavity, varying from 1 c.c. for an abscess the size of a pigeon's egg up to 5 c.c. for one of larger size—the latter amount should not be exceeded at any single injection. The interval between injections is at first five to eight days, but as evidence of improvement appears the interval is increased to fifteen days. It is most important that the injection be made into the centre of the abscess cavity, for any escape into the surrounding tissues is apt to be followed by signs of an acutely irritative nature. If the contents of the abscess cavity are so dense as to defy aspiration, the needle is passed into different parts of the area and multiple small injections made. There is usually a good deal of pain following the injection, but this subsides in some hours. If the abscess is superficial, redness, tenderness, and local rise of temperature may ensue, but subside within forty-eight hours. Evidence of improvement appears about four days after the injection is made, taking the form of a small fibrous nodule, which spreads until contraction and sclerosis are complete. Of the seventeen cases recorded in this series, fifteen showed either complete cure or a very striking degree of improvement.

Dietetic Treatment in Surgical Tuberculosis.—This question is the subject of several interesting papers in recent German literature. P. Laćný[7] reports the results of a series of observations carried out in Chlumsky's clinic in Cracow. The genesis of the idea evidently arose in a somewhat oblique fashion, but more particularly it originated in the observation that arthritic subjects with a superfluity of body salts owing to faulty excretion and deficient metabolism rarely suffer from tuberculosis. A **Dry Diet** was accordingly instituted for tuberculous patients, the liquid intake being reduced to a minimum, and, in order to reduce thirst, salt was eliminated from the diet as far as possible. All preserved or spiced food was excluded, and no milk was given; otherwise the diet was of the ordinary type. Children and pyrexia cases were excluded from this régime—the former in case of interference with body growth, the latter because of the intolerable thirst which necessarily ensued. The results are peculiarly interesting. The experiment was maintained over a period of two months, and the patients all showed an increase of weight, fistulous wounds healed, and abscesses disappeared, while a peculiar sense of well-being developed. The average urine output was 0·3 to 0·5 litre a day, showing a specific gravity of 1027 to 1033, and an average chloride content of 2 to 6 grm. per day. Twenty-seven cases formed the subject of this experiment.

The second paper is contributed by H. von Baeyer.[8] He states that he has for some time been impressed by the efforts which Nature apparently makes in a tuberculous subject to remove fluids from the body. He believes that night sweats, for example, have a salutary influence, and that the beneficial effect of sunlight is in respect of the loss of body fluid which results. Baeyer's method is the virtual elimination of fluids over a period of fourteen days, except for a morning cup of milk and an evening cup of tea. Between meals a little fruit may be eaten, and on a particularly hot day one-eighth litre of lemonade may be allowed. Fourteen days of normal diet alternate with the fourteen days of fluid elimination, and the alternate process is repeated over a period of several months. No case details are given, but the general statement is made that in every instance there was increase in weight, a benefit in the general well-being, and a striking improvement in the local error.

REFERENCES. [1]*Jour. Amer. Med. Assoc.* 1928, i, 189; [2]*Presse méd.* 1928, July 7, 852; [3]*Munch. med. Woch.* 1928, May 25, 893, [4]*Ibid.* Jan. 27, 172; [5]*Zentralb. f. Chir.* 1928, June 9, 1420. [6]*Policlinico*, xxxiv, 301, [7]*Wien. klin. Woch.* 1927, Aug. 11, 1025; [8]*Zentralb. f. Chir.* 1927, Dec. 3, 3080.

TUBERCULOSIS, GENITAL. (*See* TESTICLES AND SEMINAL VESICLES, AFFECTIONS OF.)

TUBERCULOSIS OF THE KIDNEY. (*See* KIDNEY, SURGERY OF.)

TUBERCULOSIS, PULMONARY. (*See also* CHEST, SURGERY OF.)

W. H. Wynn, M.D., F.R.C.P.

Filtrable Virus.—Attention was called last year to the experiments of Valtis and others on the filtrable virus of the tubercle bacillus. Valtis had shown that guinea-pigs inoculated with filtrates of tuberculous products, or of cultures of tubercle bacilli, develop especially in the tracheobronchial glands lesions characterized by a more or less intense swelling. Such glands never became caseous, but smears from them showed apparently normal acid-fast bacilli. J. Valtis[1] has made numerous experiments which show that acid-fast bacilli derived from the filtrable elements have exactly the same character, as far as their pathogenic properties for guinea-pigs are concerned, and produce the same effects, as the direct inoculation of the filtrates themselves. A. Togounoff[2] has endeavoured to cultivate the bacterial elements contained in the filtrates and to determine their pathogenic properties. He finds that both virulent and avirulent cultures of tubercle bacilli may contain filtrable elements, and that these elements and the acid-fast bacilli derived from them will only exceptionally provoke specific nodular lesions in guinea-pigs inoculated with them. J. M. Alston[3] has conducted experiments on the same lines, but obtained negative results. He regards the whole question as debatable and needing much more experimental work. But even granted that it is possible to obtain a filtrate which can cause infection of animals, he asks what is the relation between normal bacilli and the infecting agent in the filtrate. Is the virus in the filtrate an altogether unformed material which later gives rise to formed organisms in the tissues, or does it consist of very small particles which develop into the larger non-filtrable form recognized under the microscope? If the latter, the question arises whether the filter-passing particles are each a complete organism capable of reproducing similar filtrable forms and representing a stage in the development of a pleomorphic organism, or whether the particles which pass the filter are only fractions of a bacillus which depend for their survival on growing into normal-sized bacilli before they can reproduce.

Immunity.—Calmette's B.C.G. Vaccine has hitherto been used for the protection of newborn infants in tuberculous surroundings. About 80,000 children in France and her colonies have received this treatment, and no harm has been reported. Among the 1200 children closely observed and controlled for a year or more the mortality from tuberculosis dropped to 1 per cent. J. Heimbeck[4] has applied the method to young Pirquet-negative adults. Whilst oral inoculation is used in the newborn, owing to the great permeability of the intestines for adults he chose subcutaneous injection. His aim was to prevent tuberculosis in nurses. About one hundred nurses began training each year in the Municipal Hospital at Oslo. These were between the ages of 20 and 25 and were in good health. On entrance 52 per cent gave a negative von Pirquet reaction. This is in contrast to the general opinion that a negative reaction is seldom found after the age of 20. Among the school-children of Oslo at the age of 9 about 85 per cent gave a positive von Pirquet. The only conclusion possible is that the nurses who gave a negative reaction were infected in childhood, but little by little they conquered their infection, the positive reaction disappeared, and they became again virgin soil for a new infection. Between 1924 and 1927 fifty nurses developed tuberculosis. Of these only three had a positive Pirquet reaction. Of the remaining nurses, only one of the 1924 class, two of the 1925, and six of the 1926 class still gave negative results. In the course of one or two years, therefore, the reactions of practically all of those who formerly gave a negative reaction to the Pirquet test had become positive, and about 20 per cent of them had contracted a tuberculous infection. This seems to show that they were uninfected and presented a virgin soil when they began their hospital service. If the two groups were considered—the healthy nurses who gave a positive reaction as a result of an old infection, and the healthy nurses with a negative reaction who soon became infected—it is seen that fresh tuberculous infection causes the greater number of cases of tuberculosis; an old infection seldom develops into the disease. In other words, the tuberculous infection generally shows its tendency at once either to conquer the organism or to be conquered by it and to establish immunity expressed by the Pirquet reaction. A positive reaction to the Pirquet test was obtained by using the B.C.G. vaccine. The dose used was 0·05 mgrm. (in some cases 0·08 mgrm.), two injections at an interval of a week. Within four weeks after the second dose there developed a small infiltration which was still present at the end of seven and a half months. All gave a positive von Pirquet reaction in six weeks. Altogether 89 Pirquet-negative nurses were inoculated, 5 in October 1926, 44 in 1927, and 40 in 1928. Two of the 89 subsequently developed tuberculosis—pleurisy in both cases, but one belonged to the 1926 class which had been exposed to infection for some months previous to inoculation, and the other developed pleurisy only a month after inoculation, i.e., at a stage when there had not been time to gain immunity. In the 1927 class 12 Pirquet nurses refused inoculation, and 5 subsequently developed tuberculosis. In the 1928 class 18 were not inoculated, and 8 subsequently developed tuberculosis. Thus for the 1927 and 1928 classes the tuberculosis morbidity among the 84 inoculated Pirquet-negative nurses was only 1·2 per cent, whereas it was 27 per cent among the 30 not inoculated. These experiences are clearly of much importance as regards the possibility of fresh infection in adults and their protection by a vaccine.

S. A. Petroff,[5] in an important paper, discusses the whole question of producing immunity in tuberculosis by means of living virulent, avirulent, and dead tubercle bacilli. He shows that the fault with all experiments in tuberculosis has been an attempt to create an absolute immunity. This cannot be accomplished, and such immunity is not needed; a relative immunity which can prevent an infection with a small number of organisms is sufficient. The immunity established with living virulent organisms is effective, and the dosage can be regulated so that a massive infection is avoided; but to keep up the immunity, inoculations must be continued and the price of actual infection must be paid. In dealing with virulent organisms one never knows what may happen in the individual when subjected to intercurrent disease. Vaccination with avirulent organisms, as with B.C.G. vaccine, is safer, but it is not yet certain that the avirulent organisms will not mutate or change into virulent organisms. The organism passing from its non-parasitic cycle in nature into the parasitic cycle in the human being or animal may or may not cause disease. Sooner or later it finds its way out of the host and acts as a menace to some other person or animal having less resistance. This chain of events may continue for a long time, causing changes which may alter the virulence of the organism, i.e., changing the avirulent or harmless organism into a virulent one. He believes that dead tubercle bacilli can be safely and effectively used in immunizing human beings. Animals sensitized with dead tubercle bacilli do not vary from those infected, anatomically, allergically, or immunologically. It is true that in order to produce the same intensity of reaction, many times more dead tubercle bacilli than living organisms must be used, but dead material does not propagate within the body.

Conjugal Tuberculosis.—A. Minnig[6] has reviewed 5000 dispensary cases. Of this number 2975 were active undoubted cases of pulmonary tuberculosis; of these 1888 were married or widowed. Of the 1888 cases, 319, or 16·8 per cent, had consorts with active tuberculosis or who had died of the disease. When one of the consorts had died the mate was infected in 50 per cent of cases. It is concluded that, when there is a particularly massive infection, if the consort's resistance is lowered he is almost sure to contract the disease. Conjugal tuberculosis is commoner in the lower strata of society. Tuberculosis in the mother appeared to be the most dangerous contact and the more frequent in marital tuberculosis.

Trauma and Pulmonary Tuberculosis.—The occasional occurrence of tuberculosis after injury to the chest is of medico-legal importance. Acute miliary tuberculosis may occur after, for instance, a blow on a tuberculous testicle or the wrenching of a tuberculous joint, and presumably in such cases a tuberculous focus has ruptured into the blood-stream; but the development of tuberculosis of the lungs as a sequel to injuries of the chest appears to be uncommon. Sergent in 1916 studied 96 chest injuries in soldiers: 87 were penetrating wounds, and of these, 80 showed no signs of tuberculosis, and in 7 tuberculosis developed later but without relation to the wounds; 9 were cases of contusion, and, of these, 4 developed a mild tuberculosis and 1 a severe form. This last was the only case that, in Sergent's opinion, had any direct relation to the accident. The infrequency after war wounds has been noticed by many observers. Most of the recorded cases have followed injuries involving compression, such as crushing by falls of coal, etc., or the impact of a large object against a considerable area of the chest.

N. Tattersall[7] has surveyed the history of 300 consecutive cases, and finds that whilst injury was suggested as a cause in six, there were four in which the evidence clearly linked up the onset of symptoms and the fact of injury. The two following are examples. A finely built man, age 42, with an excellent health record, received a severe blow in the left axilla from the mudguard of a motor-car. He returned to work in three days, but two weeks later had cough and persistent pain in the side. Signs of early tuberculosis were found in the axilla, the sputum was positive, and he died in six months. There was no hæmoptysis at the time of the accident. An ex-sergeant, age 36, playing Rugby football regularly and in full training, was heavily tackled, another player falling with his knee on the patient's right shoulder. That evening he had hæmoptysis. He had slight cough and sputum for some months and was not well enough to play again. Thirteen months after the injury he again had hæmoptysis, and marked signs were found in the right lung, with positive sputum.

V. Hinault and Moralis[8] record two similar cases. In one a fall from a ladder on to the right chest was followed in two days by hæmoptysis and development of signs in the right upper lobe. In the other an automobile accident caused concussion and injury to the right side of the chest; this was followed by signs of thickening of the right pleura, and a month later by definite signs of tuberculosis of the right upper lobe. In none of these cases was there a fracture of ribs, and the previous health was decidedly good. Tattersall suggests that in his first case a caseous root-gland had ruptured into a bronchus and caused the acute and fatal disease, and that in the other a latent apical focus was compressed or torn. Hæmoptysis and pleurisy are symptoms of great importance, though neither is essential in establishing a claim for compensation. Their importance lies in the fact that they will assist in fixing a date of onset of symptoms, will usually lead to the seeking of medical advice, and hæmoptysis in particular will not only impress the patient, but if observed by others may be valuable corroborative evidence. In the absence of dramatic symptoms the establishment of a claim may rest entirely on slight but persistent evidence of ill health which bridged the interval between injury and diagnosis. X-ray evidence may be valuable in demonstrating an old and possibly calcified lesion with evidence of recent acute spread. In most cases it cannot be proved that apart from the injury the patient would later on have suffered from tuberculosis, but if the evidence convinces us that trauma adversely affected the existing condition it must be considered the materially effective cause of the present ill health.

Tuberculosis in Infancy.—M. A. Asserson[9] has inquired into the after-history of 460 infants who had been treated at hospital for various ailments and who gave positive von Pirquet tests. The after-histories showed: (1) 112 cases suffering from advanced tuberculosis (pulmonary, miliary, or meningeal); of these 96 per cent died soon after admission to hospital. (2) 32 cases suffering from tuberculosis of bones, joints, or glands; of these 32 per cent were found to be dead, of whom just over one-half were stated to have died from tuberculosis. (3) 316 cases gave no clinical signs of disease. Skiagrams suggested enlargement of tracheobronchial glands in 61 cases; of these 6·5 per cent had died of tuberculosis and 14·5 per cent from other causes. Of the remainder (207), 39 per cent had died, but death was attributed to tuberculosis in only 3·7 per cent. The conclusion drawn from these figures is that resistance to tuberculous infection in infants is higher than is generally supposed. Comparison of contact and non-contact with open tuberculosis proved that the mortality from tuberculosis is exceedingly high among infants exposed to contact in the family. Infants not so exposed who receive infection in a more casual way from outside sources develop a surprising degree of resistance. Of 40 infants who remained in contact with phthisical mothers, 65 per cent died of tuberculosis; whilst of 37 infants boarded out only 1 died of the disease, although all had been infected. The highest death-rates were among those who had been exposed to infection at the earliest ages.

TREATMENT.—

Collapse Therapy.—E. Rist and F. Hirschberg[10] have tried to ascertain the percentage of cures in a series of cases by comparing the after-history of patients treated by artificial pneumothorax with that of others as nearly as possible similar who did not have this treatment. The patients selected for the study had unilateral disease, positive sputum, and in each at least half a lobe was affected. There were 759, and these included all the cases of this type treated between 1912 and 1926. The controls numbered 468; in these either treatment was refused or adhesions prevented collapse. At the end of the period 52 per cent of the treated patients were clinically healed, free from symptoms, the sputum was negative, and they were able to lead more or less ordinary lives; 32 per cent were dead, and the remainder were unbenefited or worse. Of the controls, 54 per cent had died, and none was fit for employment or had ceased to expectorate tubercle bacilli. A further study was carried out on a group of cases first seen between July, 1919, and July, 1921. The figures again demonstrated the value of collapse therapy. The percentage of the controls who were dead by the eighth year was 90, more than twice as high as the figure for the treated cases; 35·8 per cent of the treated cases were classed as healed, and none of the untreated cases had recovered or was fit for work. Among the treated cases nearly 50 per cent of the deaths occurred in the first two years after induction. After this period the mortality-rate fell, and no deaths were recorded after the fifth year had passed. They consider that the word 'cure' should not be used until three years have passed during which there has been complete freedom from symptoms and an absence of tubercle bacilli from the sputum. At this stage the question of abandoning the refills may be considered. After the fifth year the danger of relapse is slight, and in many cases it is advisable to maintain collapse until five years after induction.

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TUBERCULOSIS OF THE SPINE. (*See* SPINE; TUBERCULOSIS OF BONES.)

TUBERCULOUS GLANDS IN THE NECK.

Sir W. I. de C. Wheeler, F.R.C.S.I.

W. H. Bowen[1] discusses the question of the removal of all tonsils and adenoids which cause symptoms, and the boiling of all milk taken. The argument has been used that there is established a gradual immunity by inoculation of a steady dosage. Unfortunately, this cannot be so, for the dosage is never measured. The largest dosage comes when the percentage intake of milk per body-weight is greatest, i.e., in very early life. It probably happens that a child taking tubercle-infected milk can use the dose of bacilli as an immunizing factor when in good health, but some phase of ill health, not necessarily an illness, will break down the immunity and lead to infection. Removal of tonsils and adenoids which cause symptoms is a prophylactic against the occurrence of glands in the neck. This writer thinks that the aim of surgery should be the removal of the gross mass of infection with a minimum of damage, so that the patient may be able to eliminate the residue. Two pertinent questions are dealt with: (1) Should all cases of tuberculous glands of the neck have tonsils removed? (2) If so, should the tonsil operation precede, follow, or be carried out at the same sitting? The first question is answered in the affirmative even where disease of the tonsils does not appear to be present. The second question is not so easy to answer. It depends upon the number of glands involved, and what operation is contemplated. After operation the advice of the anæsthetist should be sought. If dissection of the tonsils is decided upon instead of the guillotine operation, a two-stage procedure is advisable. If the glandular disease does not call for immediate interference, the inclination should be to operate on the throat and nose first. If there is no sign of activity of infection of the tonsils and adenoids, it is better to remove the glands first and so anticipate caseation. In many cases, however, there will be no need for the two-stage operation; caseous glands are curetted and the tonsils removed at the same sitting.

REFERENCE.—[1]*Clin. Jour.* 1927, Dec. 14.

TUBERCULOUS PERITONITIS. (*See* PERITONITIS.)

TULARÆMIA. *J. D. Rolleston, M.D.*

EPIDEMIOLOGY.—Of 420 cases reported to the Public Health Service of the United States,[1] 17 have died—a mortality of about 4 per cent. The actual number of cases and deaths is probably higher. Cases have now been reported from Japan, the District of Columbia, and from 37 States, the more north-eastern States being the only significant portion of the United States in which cases have not been recognized.

SYMPTOMS AND COMPLICATIONS.—E. W. Netherton,[2] who records an illustrative case, classifies the *cutaneous lesions* of tularæmia in the following two groups: (1) Subcutaneous nodules which simulate those seen in sporotrichosis and like them may suppurate and rupture, their situation being along the lymphatics which drain the primary lesion; (2) Erythematous papules and plaques which follow exacerbations or relapse of the systemic symptoms. Among the rare skin manifestations of tularæmia are herpes and hyperæsthesia, which may be either toxic or infective, jaundice due to damage to the liver, and acne. In Netherton's case, which occurred in a woman of 34, the eruption presented the appearance of erythema multiforme.

S. C. Fulmer and M. J. Kilbury[3] report the first case on record of *abdominal complications* in tularæmia. Their patient, a man of 40, was apparently suffering from ordinary attacks of tularæmia until abdominal symptoms developed three months after the initial infection. The abdominal condition resembled a low-grade peritonitis with ascites and gaseous distention. About 20 c.c. of greenish-tinged cloudy ascitic fluid were withdrawn. Recovery took place. Cultures on ordinary media and smears from the ascitic fluid failed to show the presence of organisms. The fluid was then centrifugalized, and the sediment was mixed with 5 c.c. of normal saline and injected into a guinea-pig, which died of tularæmia in four days. *B. tularense* was isolated from the spleen and grown on glucose cystine meat infusion agar of pH 7·3 as recommended by Francis, who first described tularæmia.

P. Bardon and G. Berdez[4] report the earliest fatal case hitherto recorded, in a man, age 53, who died of the typhoid form of the disease seventy-six days after being accidentally inoculated by the carcases of a rabbit.

REFERENCES.—[1]*Public Health Rep.* 1927, xlii, 2948; [2]*Arch. of Dermatol. and Syph.* 1927, xvi, 170; [3]*Jour. Amer. Med. Assoc.* 1927, lxxxix, 1661; [4]*Ibid.* 1928, xc, 1369.

TWILIGHT SLEEP. (*See* ANÆSTHESIA; LABOUR AND ITS COMPLICATIONS.)

TYPHOID FEVER. (*See also* PARATYPHOID FEVERS.) *J. D. Rolleston, M.D.*

EPIDEMIOLOGY.—The sixteenth annual report of the *Journal of the American Medical Association*[1] on typhoid in the cities in the United States, now numbering 81, with a population of more than 100,000, shows that there has been a progressive decline in every geographical group during the last three years. In 1927 five of the eight groups had typhoid death-rates under 2 per 100,000 population. The other three groups had rates ranging from 3·39 to 10·07.

D. G. Gill[2] remarks that though typhoid fever has been steadily decreasing throughout the United States it is still a major problem in the southern States. Most of the cases are found in the small towns and strictly rural districts. The highest rates occur in towns with populations under 1000, while 80 per cent of the cases are found in rural areas and towns with populations up to 5000. The causes for the high incidence of the disease are defective sanitation and water-supplies and the large number of typhoid carriers. Approximately 10 per cent of those who have had an attack of typhoid become permanent carriers, and are probably the source of most rural typhoid.

W. Fletcher[3] states that owing to the increase in number of positive Widal tests at the Institute for Medical Research at Kuala Lumpur an inquiry was made to determine if enteric fevers were common in the Federated Malay States and if they were becoming more prevalent. There were no epidemics, and typhoid lesions were rarely found post mortem. The carrier rate was less than 0·08 per cent, in contrast with a rate of between 0·3 and 1·0 per cent in the United States. The probable reasons for the low incidence of the disease are the evenly distributed heavy rainfall, the excellent water-supply of the towns, the scarcity of flies, the absence of large milk-distributing companies, and the presence of colloidal clay in the rivers. As the result of repeated Widal tests and examination of the excreta of suspected cases, 182 cases of typhoid fever, 9 of paratyphoid A, and 5 of paratyphoid B were diagnosed during the years 1925 and 1926. Enteric fever was commoner in the small collections of native houses, in which the drinking-water was obtained from a shallow well or river, and less common in towns, where there are usually excellent public water-supplies. The mortality among the cases diagnosed in the laboratory was 13 per cent.

According to A. Hansen,[4] although typhoid fever is no longer a common disease in Denmark and big epidemics are rare, small outbreaks occasionally occur, and sporadic cases may be met with all over the country. The disease is relatively more frequent in towns than in rural districts. Hansen attributes the decline in prevalence of the disease to earlier diagnosis and isolation of cases when they are least infectious, whereas formerly the diagnosis was not made till late and isolation was rarely carried out.

SYMPTOMS AND COMPLICATIONS. L. H. Hitzrot,[5] who records an illustrative case, states that there are many instances on record of the *coexistence of typhoid and malaria* in the same patient, especially in malarial districts. Typhoid fever, more than any other infectious disease, appears to rouse a dormant malaria into activity, probably because of the severe strain of a wasting disease. Typhoid is most frequently the dominant disease, rousing a dormant tuberculosis into activity. The malarial paroxysms, however, may alter the typhoid temperature curve at the onset, during the course, or most frequently in convalescence. Of 543 typhoid patients treated at the University Hospital, Philadelphia, in the period 1925–26, only 2 gave clinical and laboratory evidence of superimposed malarial infection. Hitzrot's case in a man of 35 differed from the great majority of those on record in that malaria appeared to be the dominant disease. The temperature chart resembled that of double tertian infection, and tertian parasites were found in the blood. Simultaneously cultures of *B. typhi* were obtained from the fæces and urine, and the Widal reaction, which was negative on admission, became strongly positive eight and twelve days later. This fact, and the rapidity with which the organisms disappeared from the excreta, showed that the patient was not merely a typhoid carrier. The course of the illness was mild, so that the case confirmed the view that a double infection is apt to be milder than either disease alone.

L. Montel,[6] who reports a case of *abscess of the spleen* in typhoid fever, alludes to that recently published by Morel, Dambrin, and Tapie (*see* MEDICAL ANNUAL, 1927, p. 509), and remarks that in most cases the abscess is single and situated at the upper pole of the organ, as in 13 out of 14 cases in which the site was noted. Occasionally multiple abscesses have been observed, ranging in number from two to eight. The pus is greyish or yellowish in colour and often hæmorrhagic. The organism most frequently present is the typhoid bacillus. The symptoms are unobtrusive, being usually disguised by the other manifestations of typhoid fever. Pain is the most constant symptom. No definite information is provided by palpation, but percussion shows a definite splenomegaly. The general condition is grave and the face is pinched. In view of these vague signs it is not surprising that the condition is as a rule not discovered until the autopsy. If left to itself splenic abscess either causes death at once or gives rise to a series of complications in the abdomen such as peritonitis or perforation of the colon, or more often in the thorax, such as adhesive, serous, hæmorrhagic, or purulent pleurisy. Montel's case, which occurred in a man who had been inoculated against typhoid, was remarkable in that abscess of the spleen was complicated by purulent pleurisy on the left side and perforation of the diaphragm. The organism isolated from the blood was probably of a typho-paratyphoid nature, but was distinctly atypical. The Widal reaction did not give any definite result with any of the typhoid or paratyphoid organisms.

According to J. Schiffmann,[7] who reports a personal case, *inflammation of the breast* is one of the rare complications of typhoid fever. In his monograph on the surgical complications of the disease, Madelung collected 80 cases from the literature up to 1923. Most of these were merely examples of infiltrations occurring during typhoid fever or in convalescence, and subsided spontaneously. An abscess ensued in only 9 cases, in 7 of which a bacteriological examination was made. In 3 of these typhoid bacilli were found, in 2 in pure culture, and in 1 associated with *Staphylococcus aureus*. Schiffmann's case occurred in a woman, age 26, who had been twice pregnant and had had mastitis of both breasts after each confinement. Two years after the birth of her last child she contracted typhoid fever complicated by femoral thrombosis. Two months after recovery she developed mastitis, first in the right and then in the left breast. Suppuration took place in both, and typhoid bacilli were found in pure culture. Slow recovery took place.

An example of *non-obliterative parietal arteritis* in typhoid fever, which was first described by Vulpian in 1883, is reported by L. Ramond.[8] The patient was a man, age 43, who on the tenth day of typhoid fever was suddenly seized with severe pain and complete loss of power in the lower limbs, which became cold and discoloured, especially at the extremities. Within twelve hours, however, considerable improvement took place, and the following day the appearance of the limbs was absolutely normal. Although the patient complained of tingling in the palmar aspect of the right hand, especially in the last three fingers, the skin was not cold or discoloured. The symptoms lasted three days and then disappeared. Subsequent recovery was uneventful.

C. Imperiale,[9] who records a case of *symmetrical gangrene of the extremities* following typhoid fever, states that of all the numerous infectious diseases followed by gangrene of the extremities typhoid fever occupies the first place. Of 102 cases of post-infective gangrene collected by Barraud, 44 were due to this cause. Predisposing causes include cold and damp, excessive physical exertion, and pre-existing diseases such as syphilis, nephritis, diabetes, arteriosclerosis, alcoholism, and indulgence in tobacco. As a rule the lower extremities are affected, the right as often as the left, but the simultaneous appearance of gangrene in both is rare. The upper limbs are seldom involved. Post-infective symmetrical gangrene presents a characteristic clinical picture in that the onset is sudden and the progress rapid and extensive. The condition can readily be distinguished from Raynaud's disease, in which there is a long prodromal period and a certain periodicity of the symptoms. As regards the pathogenesis, post-typhoid gangrene is usually due to arterial thrombosis, with which may be associated vascular spasm of sympathetic origin. The prognosis is grave, the mortality being about 50 per cent. Imperiale's case occurred in a soldier, age 20, who developed gangrene first in the right and shortly afterwards in the left leg about a month after the onset of an ordinary attack of typhoid fever. Amputation on the right side was performed in the middle half of the thigh and on the left at the upper third of the leg. Recovery took place. Examination of the arteries in the amputated limbs showed thickening of the intima and the formation of a thrombus.

C. G. Nagtegaal[10] reports the first case on record of *encephalitis* following typhoid The patient was a girl of 15, who directly after an attack of typhoid fever, the clinical diagnosis of which was confirmed by the Widal reaction, developed symptoms of Parkinsonism such as a masklike facies, rigidity of the muscles, and change of character resembling that following lethargic encephalitis.

According to Alajouanine, Fribourg-Blanc, and Gauthier[11] *nervous sequelæ of antityphoid inoculation* are rare, especially in the army, where the method is carried out on a large scale and in the immense majority of cases without any ill-effects. Nervous sequelæ, however, have been recorded in the form of hemiplegia, epileptic fits, meningeal symptoms, polyneuritis, or Landry's paralysis. The authors report a case of a previously healthy soldier, 21 years old, who forty-eight hours after the second inoculation with T.A.B. vaccine fifteen months after the first, which had been uneventful, developed monoparesis and marked amyotrophy of the left lower limb, with reaction of degeneration in the tibialis anticus.

DIAGNOSIS.—L. Poleff[12] discusses the value of the Widal reaction after antityphoid inoculation in a paper based on his own experience and a review of the literature, including the recent article by Schembra (*see* MEDICAL ANNUAL, 1928, p. 504), and comes to the following conclusions: (1) A positive reaction in the first two months after inoculation is not conclusive. (2) A positive reaction subsequently is only reliable when the titre is relatively high and shows a further rise on repetition of the test. (3) A sudden rise of titre in the course of non-typhoid febrile disease is very exceptional even in the inoculated. In doubtful cases the test should be repeated. (4) With these reservations the Widal test retains its diagnostic value in cases which have been inoculated.

TREATMENT.—H. Schotter, S. Brodskaja, and G. Sinai,[13] who remark that though the vaccine treatment of typhoid fever was introduced by Fraenkel in 1898 the question of its efficacy is still unsettled, record their observations on the vaccine treatment of 41 cases, of which 36 were typhoid and 5 paratyphoid, while 30 controls, of whom 26 were typhoid and 4 paratyphoid, were given symptomatic treatment only. Although no bad effects were produced, the results were not encouraging and hardly seemed to justify the time spent in the preparation of the vaccines.

The use of **Anti-gangrene Serum** in severe cases of typhoid fever is recommended by M. Weinberg and G. Thibault[14] on the ground that anaerobic organisms are liable to pass through the intestinal wall at the site of the typhoid ulcers and cause septicæmia or aggravate the local lesions.

G. Hänsch and E. Hartmann[15] carried out **Blood Transfusion** in 34 cases of severe or moderately severe typhoid fever, the donors being convalescents or those who had been inoculated against typhoid. The only contra-indication was the severest form of lung complication. The treatment had a favourable effect on the general condition, the temperature, and intestinal hæmorrhage and decidedly lowered the mortality.

REFERENCES.—[1] *Jour. Amer. Med. Assoc.* 1928, xc, 1624; [2] *Ibid.* 1927, lxxxix, 1198; [3] *Bull. Inst. Med. Research Fed. Malay States*, 1927, No. 4; [4] *Hospitalstidende*, 1928, 25

[5] *Jour. Amer. Med. Assoc.* 1927, lxxxix, 596; [6] *Ann. de Méd.* 1927, 489; [7] *Deut. med. Woch.* 1927, 1643; [8] *Presse méd.* 1928, 315; [9] *Riforma Med.* 1928, 242; [10] *Nederl. Tijds. v. Geneesk.* 1927, ii, 2079; [11] *Bull. et Mém. Soc. méd. Hôp. de Paris*, 1928, 446; [12] *Deut. med. Woch.* 1927, 2018; [13] *Wien. klin. Woch.* 1928, 297; [14] *Comptes rend. Soc. de Biol.* 1927, xcvii, 1476; [15] *Deut. med. Woch.* 1927, 2017.

TYPHUS FEVER.

J. D. Rolleston, M.D.

EPIDEMIOLOGY.—P. Remlinger[1] illustrates the prevalence of typhus by the fact that in the course of 1927 520 cases were notified in Tunis, 747 in Egypt, 887 in Algeria, 2719 in Roumania, 3033 in Poland, and 1600 in Morocco, where 1800 fresh cases were notified between January 1 and 28, 1928.

Since the communications of Olmer and Netter (*see* MEDICAL ANNUAL, 1928, p. 505) numerous articles have been published by French writers such as Boinet and Piéri,[2] D. Olmer and J. Olmer,[3] Plazy, Marçon and Carboni,[4] D. Olmer,[5] Oelsnitz,[6] and E. Burnet and J. Olmer[7] on outbreaks of an acute eruptive fever observed in the neighbourhood of Marseilles and on the Mediterranean coast. The affection was mild, since all the patients made an uninterrupted recovery. The onset was sudden, with fever, headache, and generalized pains. Between the second and eighth day appeared an eruption either of a morbilliform type or presenting the character of rose spots. In a few cases the eruption became purpuric. The fever lasted eight to fourteen days, and usually subsided rapidly, but sometimes ended by lysis. No parasites were found on any of the patients, and laboratory tests such as the Widal and Weil-Felix reactions and inoculation of guinea-pigs were usually negative, though occasionally positive Weil-Felix reactions were found (Olmer[5]). Although complete agreement does not appear to have been reached, the disease is probably closely allied to tropical typhus (*see* MEDICAL ANNUAL, 1928, pp. 504, 506.)

The disease occurring in Adelaide and its suburbs since 1918 to which F. S. Hone[8] has devoted three previous articles, forms the subject of a fresh paper by him in which he states that since his last communication he has collected details of 81 more cases which presented the same clinical picture as those previously described. In its relatively mild character, absence of lice and association with rodents, as well as in its sporadic distribution, the Australian disease bears a striking resemblance to tropical typhus. Of the 81 cases only 5 died—a mortality of about 6 per cent.

PATHOLOGY.—M. Francke, M. Buciuscan, and A. Thoma[9] investigated the *blood and cerebrospinal fluid* of 60 cases of typhus at various stages of the disease with the following results. Examination of 408 specimens of blood showed a slight increase of red corpuscles, and a constant leucocytosis but never exceeding 24,000 per c.mm. There was an absence of eosinophils in all the cases studied. Plasma-cells were present in 8 per cent. All the cases showed hypertension of the cerebrospinal fluid and a lymphocytosis of 170 per c.mm. The lymphocytosis began on the first day of disease, reached its maximum on the tenth or thirteenth day, and lasted during convalescence up to the twenty-third or twenty-fourth day. The Nonne-Apelt reaction was constantly negative.

SYMPTOMS AND COMPLICATIONS.—D. Daniélopolu, N. Lupu, C. Nicolau, and Petresco[10] state that typhus is one of the infections in which the *heart* is most frequently affected. The lesions are localized exclusively in the myocardium. The cardiac phenomena, which usually occur during the second week, are more intense in the hypertoxic than in the mild forms, and in old persons than in the young. Myocardial insufficiency in typhus is usually manifested by a pulse-rate over 120, sometimes reaching 140 or 150 or more and occasionally accompanied by extrasystoles. It is favourably affected by **Strophanthin** in fractional doses.

Diagnosis.—Francke, Buciuscan, and Thoma[9] illustrate the value of the Weil-Felix reaction by the fact that of 113 examinations of typhus cases it was negative in only 2·65 per cent. During the first few days of the disease it was positive in only 12·38 per cent, but the proportion of positive reactions rose to 70·88 per cent from the fifth to the tenth day and reached a maximum of 97·4 per cent from the tenth to the fourteenth day.

P. Remlinger[1] draws attention to the *tongue sign* described by him in 1916 which is present before the Weil-Felix reaction is positive. It consists in difficulty in putting out the tongue and the presence of fine tremors in the organ when it is extruded. He claims that it is of considerable value in distinguishing typhus from typhoid fever, in which the sign is usually absent. The value of the sign is confirmed by Y. Campaux[11] from observations of typhus in Morocco.

Prophylaxis.—C. Nicolle[12] states that the **Serum of Typhus Convalescents** has no therapeutical action but can be used only for prophylaxis, especially for those whose professional duties bring them into contact with typhus patients. It is particularly valuable in protecting those who have been found to be carriers of lice from typhus patients. In 100 such cases, including persons who had been actually bitten by lice, in which the serum was injected, the method has been invariably successful. The immunity conferred is immediate but very transient, unlike the more permanent protection resulting from inoculation against typhoid fever, cholera, or plague. The serum should be taken from the typhus patient between the sixth and thirteenth day after the temperature has become normal. Ten c.c. are injected subcutaneously, and this dose is repeated under the following circumstances: (1) In persons bitten by lice, when the second injection should be given six to eight days after the first; (2) In the case of continued exposure to infection, when the inoculations should be repeated every ten to twelve days.

References. [1] *Bull. Soc. de Pathol. exotique*, 1928, 302; [2] *Presse méd.* 1927, 1345; [3] *Ibid.* 1346; [4] *Bull. de l'Acad. de Méd.* 1927, xcviii, 348; [5] *Ibid.* 500; [6] *Ibid.* 505; [7] *Arch. de l'Inst. Pasteur de Tunis*, 1927, 317; [8] *Med. Jour. of Australia*, 1927, ii, 213; [9] *Comptes rend. Soc. de Biol.* 1927, xcvii, 1425; [10] *Presse méd.* 1927, 1257; [11] *Thèse de Paris*, 1927, No. 385; [12] *Arch. de l'Inst. Pasteur de Tunis*, 1927, 309.

ULCERS, VARICOSE. (*See* Varicose Ulcers; Varicose Veins.)

UNDULANT FEVER. (*See* Malta Fever.)

URETER, DISEASES OF.

Sir John Thomson-Walker, F.R.C.S.

The Opaque Ureteral Catheter.—R. L. Dourmashkin[1] considers that the use of the opaque catheter is the most reliable method by means of which most of the shadows in the neighbourhood of the ureter can be demonstrated as being extra-ureteral. Two possible errors are a double ureter (2 in 355 cases of stone in the ureter) or a stone free in a dilated segment of ureter. The opaque catheter is, however, of no diagnostic value when the suspected shadow is found in close proximity to that of the catheter, as this may be due to juxtaposition of an extra-ureteral shadow with that of the catheter. Wax-tipped catheters are entirely unreliable, as the stone may be too smooth to produce scratches, or it may be covered by a film of slimy mucus, or the ureter may be dilated and the wax bulb does not touch the stone. Double exposure from different angles is of great value in some cases, but this is not always successful, as the doubtful shadow may remain in the line of the ureter in both exposures; stereoscopic photographs may fail for the same reason. Ureterography seldom helps except when a uric acid stone shows as a clearer area in the opaque medium. The writer has devised a 'rubber-bag catheter' which can be inflated in the ureter.

The rubber bag is attached to the tip of the catheter at its proximal end, and when inflated expands laterally and longitudinally. If lying below the calculus, it will expand until the stone is reached. This longitudinal expansion stops at an impacted stone, but pushes up a movable stone for four or five centimetres. In all cases the resulting picture shows " the stone above the inflated bag, or if the bag is alongside the stone the calculus will indent it. A rubber bag introduced below the shadow, lying close to an ordinary opaque catheter, will, when distended with opaque solution, cause the complete disappearance of any shadow of extra-ureteral origin, while that of a true stone will be seen above the 'bagogram'."

Ureteral Stricture.—M. Schreiber[2] has investigated on post-mortem subjects the question of ureteral stricture. The existing evidence in regard to stricture is based on pyelography and on the 'wax-bulb hang' method of Hunner. The writer concludes, as a result of his observations on one hundred consecutive unselected post-mortems, that stricture of the ureter does exist as a definite pathological entity. Ureteral stricture was found in 12 per cent of the series.

As a localized intrinsic inflammatory process in the ureteral wall, metastatic in character and due to focal infection, ureteral stricture either does not occur or is relatively extremely rare as compared with ureteral strictures or stenoses of other origin. Narrowing is found most commonly in the pelvic ureter in a zone about 2 to 6 cm. above the ureteral orifice. The writer regards the following pathological conditions as being the chief causes of ureteral stricture in order of importance: (1) Congenitally accentuated narrowing of a congenital physiologically narrow site; (2) Extension of inflammatory processes into the ureteral wall from adnexal disease with and without thrombophlebitis and advanced chronic cystitis; (3) The occluding, kinking power of crossing anatomical structures—namely, the vas deferens in the male and the uterine artery in the female.

Ureteral Transplantation.—R. C. Coffey[3] describes in detail a modified technique for the implantation of the ureter into the large bowel. Experience gained by means of his former technique showed that: (1) Infection emanating from the incision in the intestine was the most frequent cause of immediate fatality following the implantation of the ureter; (2) It was difficult to find a rubber tube stiff enough to withstand a ligature which is later to cut through the ureter, and at the same time having a calibre sufficient to admit of free drainage of the urine; (3) A ureteral catheter, if large enough, is ideal for the purpose mentioned under (2), except for the fact that being smooth, it very easily slips from the grasp of the ligature which has been thrown round the ureter. In order to overcome these difficulties, the following technique was developed and proved both experimentally and clinically: The bowel, cleared with castor oil the day before operation, is flushed out thoroughly from below two hours before operation. The abdomen is opened low down and near the mid-line. After packing off the small bowel, the upper end of the sigmoid colon is lightly clamped. An assistant now passes a sigmoidoscope into the rectum from below. A cannula is inserted into the lumen of the sigmoid, and the gut below the clamp is thoroughly irrigated from above until the flow from below is quite clear, when the cannula is removed and the puncture is closed. When all lotion has escaped from below, an assistant replaces the obturator in the sigmoidoscope and passes the instrument along the sigmoid under the guidance of the hand of the operator. With suitable long-handled forceps, a long strip of gauze is introduced through the sigmoidoscope so as lightly to fill the gut below the clamp. This packing absorbs any remaining fluid, and by supporting the bowel wall makes the operation much easier. The ureters are now located, divided as near to the bladder as possible, the distal stumps are ligatured and touched with pure carbolic, and the proximal ends liberated for three or four inches by slitting the peritoneum over them. An 8 F. ureteral catheter, upon which has been placed a piece of rubber tubing ¾ in. long, about four to six inches above its tip, and fixed by several thread ligatures, is taken, and a thread passed through the wall of its proximal end, leaving a free end, after knotting, of some four inches in length. The catheter has now been prepared for use. The sigmoid and the ends of the ureters are then packed off from the peritoneal cavity and the wall of the gut is incised. "To avoid too much narrowing, one incision should be higher up the bowel than the other. The incision should begin near the mesenteric edge and extend downward and obliquely toward the antimesenteric border so as to avoid as many of the large vessels as possible. The incision should be about an inch and a half in length and should go through the peritoneum and muscle, permitting the mucosa to pout out partially through the incision." The proximal end of a ureter is now incised in its long axis on one side and the catheter inserted into it as far as the cuff of rubber tubing. A strong linen thread is passed round the split ureter and the cuff and tied tightly. A similar ligature is then tied around the ureter proximal to the incision in its long axis to prevent ascending infection. Two fixation sutures, taking all coats, are then passed on either side of the incision in the gut at its distal end, taking care not to pick up any of the gauze lying within the bowel, and while these ligatures are held a small stab wound is made in the mucosa between them. Through this wound a little of the gauze is withdrawn, to which the proximal end of the catheter is fixed by means of the ligature already attached to the latter. Having fixed both catheters in this way, the gauze is gently withdrawn from below by an assistant, taking the catheters with it, until the ureters themselves have been drawn into the bowel at the respective orifices prepared for them. The wounds in the bowel are then closed after carefully fixing the ureters by not more than two fixation sutures to the bowel wall.

W. E. Lower[4] states that of 32 cases in which he has transplanted the ureters into the bowel, the operation was done 15 times for exstrophy of the bladder, once for epispadias in a female, 6 times for vesicovaginal fistula, and 10 times for carcinoma of the bladder. In 6 of the cases the bladder was completely removed. Ten of the 32 patients are known to be living: 1, six years; 3, five years; 3, four years; 1, three years; 1, one year; and 1, three months after operation. In the writer's opinion, transplantation of the ureters into the bowel offers the best prospect of success when submucous implantation into the sigmoid is carried out by the method first proposed by Coffey.

Cancer of the Ureter.—L. P. Player[5] has collected reports of thirty-eight cases of carcinoma of the ureter from the literature, and reports one personal case. The main symptoms are pain, hæmaturia, and tumour, of which the second is the most constant. A tumour may occasionally be detected on bimanual palpation of the bladder near the ureteral orifices. Palpable tumour in the lumbar region is the result of ureteral obstruction bringing about hydronephrosis, hæmatonephrosis, or pyonephrosis.

REFERENCES.—[1]*Surg. Gynecol. and Obst.* 1928, July, 105; [2]*Ibid.* 1927, Oct., 423; [3]*Ibid.* Dec., 816; [4]*Med. Jour. and Record,* 1927, July 20, 91; [5]*Urol. and Cutan. Rev.* 1928, July, 438.

URETHRA, CONGENITAL STENOSIS OF. *John Fraser, Ch.M., F.R.C.S.Ed.*

Attention is drawn to the importance of congenital stenosis of the urinary meatus by Eric I. Lloyd.[1] The condition has a developmental origin in so far as it depends upon imperfect canalization of the terminal quarter inch of the penile urethra. Symptoms appear immediately after birth, and they take the form of difficult and painful micturition, increasing distention of the bladder, recurrent attacks of acute retention, evidence of pyrexia, and the existence of a meatal ulcer, from which a hæmaturia may arise.

The essential seriousness of the condition is in virtue of its effect on the kidneys, where the long-standing back-pressure may result in hydronephrosis and ultimately in pyonephrosis. The treatment is the simple operation of **Meatotomy,** followed by the daily passage of glass bougies until all danger of cicatricial contraction has passed.

REFERENCE.—[1] *Lancet*, 1927, ii, 1252.

URETHRA, DISEASES OF.

Sir John Thomson-Walker, F.R.C.S.

Incontinence of Urine.—L. W. Bathurst[1] describes his experience in the treatment of incontinence of urine in women by **Electrotherapy.** The causes of incontinence are: (1) Infection by the colon bacillus or other organisms, with inflammation affecting the trigone of the bladder; (2) Stone or growth in the bladder; (3) Injury to the neck of the bladder and urethra; (4) No apparent cause. Obviously in cases classed under (1) and (2) the cause must be removed before there can be any hope of improvement from any other form of treatment. By far the most common type of case in class (3) is that due to injury sustained in childbirth, and another common cause is the excessive dilatation of the urethra with instruments or with the finger. The writer describes in detail his methods of applying the electrical current, and lays emphasis on the importance of applying it to the pubovesical muscle sheet, which consists almost entirely of unstriped muscle fibres and is attached anteriorly to the back of the symphysis pubis and posteriorly to the cervix at its junction with the vagina, whereas laterally it unites with Mackenrodt's ligament on either side. It would seem that the loss of control is due to weakness of some of these fibres, and that the good results obtained by electrical treatment are due to stimulation of these fibres and a regaining of power; but how far they may be due to stimulation of surrounding voluntary muscles as well the writer is not prepared to say. It has never, to his knowledge, been suggested that these cases are due to faulty innervation, and he does not attribute the results obtained to nerve stimulation.

O. S. Lowsley[2] reports six cases of incontinence of urine, the causes of which were congenital incontinence of unknown cause, congenital incontinence associated with spina bifida, congenital incontinence associated with complete epispadias, traumatic incontinence following perineal prostatectomy (2 cases), and traumatic incontinence following on a prolonged instrumental delivery. In the treatment of these cases the same general principle was applied in all—namely, suprapubic cystotomy to divert the urinary stream, using a double suprapubic suction tube. In this way the wounds were kept dry and no urine was allowed to pass over the repaired urethra. The principle involved in the actual reconstruction of the sphincteric portion of the urethra was to make it as small as possible by resecting a wedge-shaped portion of the vesical outlet, so that the muscles of that structure would have an opportunity to become effective as a sphincter. The cases are described by the author in some detail.

Stricture.—A. O. Ross[3] has analysed 50 consecutive cases of stricture of the urethra, and found that in 33 (66 per cent) the Wassermann reaction was positive, that in 6 (12 per cent) there was a history of syphilis although the Wassermann was negative, while in 11 (22 per cent) there was no history of syphilis and the Wassermann was negative. The writer is of opinion that stricture of the urethra is more common in cases which have coincident syphilis and gonorrhœa, and that it is good practice to ascertain the Wasserman reaction of the blood in all cases of stricture. In cases of long standing, a negative

Wassermann reaction may become positive after a provocative dose of neosalvarsan.

Urethral Calculi.—In a paper on this subject G. P. B. Huddy[4] points to the wide difference in the clinical features between the primary and secondary stones. The primary calculi usually manifest themselves insidiously, and may be latent for many years without giving rise to any apparent trouble, while the secondary stones—that is, stones which have become impacted in the urethra—give rise to sudden severe symptoms. That a migrating calculus may settle in the urethra and grow in size has been disputed, for the pain is such that it usually demands prompt removal of the stone. In children, the calculi are almost always of the secondary variety. A sudden onset, with screaming, straining, and gripping at the penis and the frequent passage of urine in small quantities, is characteristic, and may be followed by retention, abscess formation, and extravasation. In adults, the presence of primary stones gives rise to symptoms of varying degrees of severity, such as perineal and penile pain, urgency and frequency of micturition, hæmaturia, and urethral discharge. Dysuria may occur, possibly associated with alterations in the urinary stream, and may progress to complete retention. Occasionally the attention of the patient is drawn to the condition by the presence of a lump. Secondary stone causes a sudden onset of pain striking along the penis, often with strangury, which may be followed by retention. Stones involving the prostatic urethra may result in incontinence of urine from interference with the sphincteric apparatus, or may cause pain on defæcation. In some cases the symptoms are intermittent, and may be modified by such complications as peri-urethral abscess, extravasation of urine, and epididymo-orchitis.

Cancer of the Urethra. J. J. Robb[5] reports two cases of carcinoma of the male urethra. Judging from cases reported in the literature, the disease usually occurs in the bulbous portion of the urethra, where it may arise in Cowper's glands or in other glandular structures. The writer states that he has been unable to find any record or specimen of carcinoma of the urethra which has originated in a stricture, so that the second case he reports would appear to be distinctly unusual. The first patient, age 69 years, was first seen with retention of urine, and had to be submitted to suprapubic cystotomy, owing to the great difficulty of passing instruments. Subsequently the whole penis, including the triangular ligament, was removed, giving temporary relief, the patient dying some ten months later. Microscopic examination of the growth showed it to be a transitional-celled carcinoma with an abundant stroma of fibrous interstitial tissue. The second patient, age 59, had a urethral stricture for which frequent instrumentation was carried out. About one year before there was increased pain on instrumentation and some discharge, and a small hard nodule about the size of a pea was noticed on the left side of the penis at the level of the penoscrotal junction. Instrumentation became impossible and the stricture was excised, no suspicion of malignancy having been entertained. On microscopic examination, a transitional-celled carcinoma was found. Recurrence occurred some ten weeks later at the site of the excision, and shortly after, complete amputation of the penis and scrotum, together with replacement of one testicle in the inguinal canal, was performed.

Paget's Disease of the Glans Penis.—M. P. Susman[6] summarizes the cases of extramammary Paget's disease, numbering thirty-three, hitherto reported, and describes a case of this disease affecting the glans penis. The author's case brings the total of reported cases of Paget's disease affecting the glans penis to seven. This case, a painter, age 60, complained of an itchy excoriation around the urethral meatus of a year's duration. An area of skin immediately around the meatus showed a finely granular, intensely red, raw surface, simulating a very acute eczema, which gave off a viscid, clear yellowish exudation. The sharp definition and slight induration distinguished the condition from ordinary eczema. The penis was amputated just in front of the pubes, and no evidence of deep carcinoma was found. On microscopic examination, proliferation of the Malpighian layer was seen extending into the corium, associated with marked proliferation of round cells and hyperplasia of connective tissues. The characteristic Paget cells were seen. The writer emphasizes the general similarity of the histological appearances of the lesion to those met with in the case of basal-cell carcinoma (rodent ulcer), a condition which has never been reported as having been seen on the glans penis.

REFERENCES.—[1]*Proc. Roy. Soc. Med.* (Electrotherap. Sect.) 1928, xxi, 35; [2]*Jour. Amer. Med. Assoc.* 1928, i, 511; [3]*Brit. Med. Jour.* 1927, ii, 266; [4]*Brit. Jour. Surg.* 1927, Oct., 307; [5]*Ibid.* 1928, April, 605; [6]*Ibid.* 635.

URINARY ANTISEPSIS.

Sir John Thomson-Walker, F.R.C.S.

In a paper on "Diuresis versus Antisepsis in the Treatment of Urinary Infections", V. Leonard[1] states that the ingestion of large quantities of water together with various salts, such as sodium bicarbonate or the citrates, had become a standard procedure in the treatment of urinary infections long before the advent of internal urinary antiseptics. Opinion is probably unanimous to-day that in the acute urinary infections this treatment shortens the course of the disease, and that in the chronic urinary infections it is distinctly palliative. Since all the organisms commonly invading the urinary tract grow readily in urine of any hydrogen-ion concentration which it is possible to attain by the administration of any drug, it would appear that alkalization of the urine is probably of little significance *per se*. The salts employed for this purpose, however, all possess diuretic action, and it seems probable that their value depends chiefly on this property. In other words, the treatment of urinary infection by 'forcing fluids' and 'alkalization' is essentially treatment by diuresis. Hexamine is probably of little or no value at the kidney level under any circumstances, and can be effective as a urinary antiseptic by virtue of the liberation of formaldehyde in the bladder only if diuresis is avoided and the bladder emptied only at intervals of from four to six hours. It is thus valueless in patients with a urinary fistula or in whom an indwelling catheter has been placed. During treatment with hexylresorcinol it is essential that the ingestion of large quantities of fluids and diuretic drugs be avoided, for in this way not only is the concentration of hexylresorcinol in the urine not lowered, but also its bactericidal properties are not interfered with by the rise in the surface tension of the urine which accompanies dilution. Hexylresorcinol is equally active in an acid or an alkaline urine, yet the diuretic properties of therapeutic doses of sodium bicarbonate may be sufficient to render the drug inactive in the urine owing to the dilution and consequent rise in surface tension which results.

A. S. Roe,[2] in a paper on pyelitis, states that "there is no agreement concerning the value of *washing out a kidney pelvis*. Personally I believe that washing out with antiseptics is wrong and may be extremely dangerous. Whatever value the method may have at times, this would be due to the release of the residual urine from the kidney pelvis or to the dilatation of a stricture in the ureter. The pelvis of the kidney is extremely delicate to deal with; the more diseased, the less sensitive as a rule; consequently the more valuable a kidney is to the individual, the more likely one is to do it damage by intrapelvic manipulation." [Renal lavage is not deserving of this sweeping condemnation. In the hands of a competent urologist who has sufficient judgement and experience to select the cases requiring this treatment, it is a very valuable method.—J. T.-W.]

The In-lying Ureteral Catheter.—D. N. Eisendrath[3] advocates a more extensive use of the 'in-lying' ureteral catheter, leaving the catheter in position for a period of days or even weeks. Although at first recommended for the relief of obstructive anuria and the treatment of non-tuberculous renal infections, the writer considers that in the following conditions benefit may also be derived from its use: for the relief of pain in cases in which the ureter is obstructed either by a calculus or by kinking in association with an unduly mobile kidney; in cases of ureteral injury following on pelvic operations, and as a method of draining the kidney after the repair of a vesico-vaginal fistula. A small catheter is to be preferred, as it permits of drainage alongside as well as through the catheter. If fever persists in spite of the use of the in-lying catheter in cases of acute or subacute pyelonephritis, extension of infection to the perirenal tissue, or such a severe degree of involvement of the parenchyma as to make it advisable to consider operative interference, should be suspected.

[The 'in-lying' ureteral catheter was advocated many years ago by Albarran and others for infections of the kidney and renal pelvis. The method was abandoned on account of the renal colic produced, the blocking of the lumen of the ureteral catheter, and the fact that the catheter very frequently slipped out of the ureter. —J. T.-W.]

REFERENCES. [1]*Jour. Amer. Med. Assoc.* 1927, ii. 517; [2]*Med. Jour. of Australia*, 1928, March 17, 326; [3]*Jour. Amer. Med. Assoc.* 1927, ii, 2170.

URINARY CALCULI.

Sir John Thomson-Walker, F.R.C.S.

Discussing the *formation of urinary calculi*, J. S. Joly[1] states that normal urine is always grossly supersaturated in regard to the stone-forming salts, which are kept in solution by the action of the colloids. This action is best explained by the theory of adsorption. The amount of the stone-forming salts which can be held in solution depends on the surface area of the colloid and therefore on its state of subdivision. Precipitation of these salts is due to the failure of the colloid to hold them in solution. It may be due to an insufficient quantity, but is more probably due to coagulation of the colloid. When precipitation occurs in the urinary passages, the crystals are usually retained in the lower calix of the kidney. A crystalline deposit tends to grow into crystalline concretions under the action of surface energy, thus forming true primary calculi. Stones of this type soon irritate the wall of the cavity in which they are contained, and cause a reactionary exudate. The laminated stone is formed by continued deposition of crystals, coupled with rhythmic precipitation of a foreign colloid derived from the exudate. Stones originating in infected media are formed in a similar manner.

RESULTS OF OPERATIVE TREATMENT.—E. Beer[2] states that in a series of 38 recent cases of renal calculus operated upon by himself, 23 were submitted to pyelolithotomy, 6 to pyelolithotomy combined with a small nephrotomy, 1 to nephrolithotomy, and 8 to nephrectomy. The writer states that "this very definite swing toward pyelotomy for all cases is entirely due to our X-ray control of the exposed kidney on the operating table which makes for complete removal of all stone material". The approach through the renal pelvis is also to be desired when possible, as in this way renal parenchyma is spared and the dangers of post-operative hæmorrhage are much diminished.

J. F. Dobson[3] discusses the results of the operations for renal and ureteral calculus that he has performed in the last ten years.

Of 28 patients submitted to *pyelolithotomy*, the results in 24 appear to have been satisfactory; of the remainder, one patient was untraced, one still has backache but X-ray examination is negative for evidence of stone, one has had hæmaturia since operation but has refused investigation, and one had a persistent fistula for which nephrectomy was subsequently performed, and this patient has been quite well since.

Of 18 cases in which *nephrolithotomy* was performed, 2 are not traced, 13 have made a perfectly satisfactory recovery. In 3 the result has been unsatisfactory, for in one of these recurrence of calculus formation occurred in both kidneys some two years after operation, and three years later the patient died from acute pancreatitis: in another, stones were found to be present in both kidneys six years after operation, and owing to her poor clinical condition it was considered unwise to attempt further operative treatment; and in the third subsequent nephrectomy was demanded on account of a persistent sinus.

Ureterolithotomy was performed in 14 cases, with a perfectly satisfactory result in 11. Of the 3 others, one is well but has still deposit in the urine; another has backache and shortness of breath: and the third had to have nephrectomy performed for a late fistula.

Nephrectomy was called for in 29 cases, and yielded perfectly satisfactory results in 23. Of the remaining 6 cases, 2 are well, but one suffers from asthma and the other has developed disseminated sclerosis; one is physically well but has melancholia; one states that he is not able to work; and one still complains of slight backache.

In 7 cases *nephrostomy* was performed. Two are well and healed, six and three years after operation respectively: one became well and healed and lived for nine years after operation; one is well but still has a slight watery discharge; one is fairly well but is still discharging and has backache four years after operation; one is fairly well but is still discharging: and one developed a perinephric abscess and died two years later.

Of five cases operated upon for bilateral renal calculi, two are perfectly well; one is well but has cloudy urine; one is well but has refused operation on the second kidney; while one had a recurrence of stone and a fatal anuria four years after operation.

The writer has obtained certain evidence of recurrence of stone in three cases of the series, two after nephrolithotomy and one after operation for bilateral calculus, and in eleven other cases symptoms have developed later which might be due to the recurrence of stone formation. Two of these have been X-rayed with a negative result, but unfortunately it has been impossible to investigate the remainder. In five cases of the series a history of previous operation for the removal of calculi was obtained.

H. G. Hamer[4] describes three cases in which large renal calculi were removed with success through an 'enlarged pyelotomy' incision. This incision was a curved one, the extension to the parenchyma being in the direction of the lower calix. In none of the cases was it found necessary to divide the retropelvic branch of the renal artery.

REFERENCES. [1]*Proc. Roy. Soc. Med.* 1928, March, 905; [2]*Ann. of Surg.* 1928, March, 428; [3]*Brit. Med. Jour.* 1928, i, 436; [4]*Boston Med. and Surg. Jour.* 1927, Nov. 10, 819.

URTICARIA.

A. M. H. Gray, M.D., F.R.C.P., F.R.C.S.

S. S. Greenbaum[1] has investigated the blood-serum calcium in cases of urticaria; the method of Clark and Collip was used. In sixty-three cases examined, representing all forms of urticaria, the blood showed a normal or increased calcium in all cases except one. Blood coagulability was tested in rather less than half these cases, and a decrease was not found in any instance, the tendency being towards an increase. He concludes that the administration of calcium salts to the majority of patients with urticaria lacks scientific basis. He also points out that the decrease in coagulability which is a feature of experimental anaphylactic shock in animals is not normally found in urticaria.

TREATMENT.—B. M. Keston[2] has employed **Ephedrine**, the active principle of the Chinese drug MaHuang (*Ephedra vulgaris*), in the treatment of chronic urticaria. The pharmacological action of the drug is similar to that of suprarenal extract, and is said to be effective when administered orally as well as hypodermically, as the low toxicity produces a more sustained effect. Patients were given an initial dose of 50 mgrm. (¾ gr.) orally in capsules. The dose was repeated at intervals of from two to six hours, and the administration was continued until all symptoms were relieved, or until further administration seemed futile in the absence of improvement. In some cases, when patients did not respond to the initial dosage, the amount was increased to as much as 120 mgrm. every two hours. No harmful effects were observed, though a few patients complained of such symptoms as tremor of the hands, weakness, headache, restlessness, palpitation, insomnia, drowsiness, and nausea. A persistent rise of 5 to 30 mm. occurred in the systolic blood-pressure during the course of treatment.

Of the cases treated, in six patients with chronic urticaria, complete relief was obtained in two, improvement in two, and no improvement in two; in eleven patients with chronic urticaria and angioneurotic œdema, seven were cured, two were improved, and two not improved.

S. S. Greenbaum,[1] from a study of this drug in eight patients, thinks it has no action on wheal formation, as wheals may come out during its administration. He thinks, however, that it is useful in relieving itching, especially in conjunction with **Epinephrin.**

REFERENCES.—[1]*Arch. of Dermatol. and Syph.* 1927, Nov., 553; [2]*Ibid.* Aug., 189.

UTERUS, AFFECTIONS OF. *Beckwith Whitehouse, M.S., F.R.C.S.*

Insulin and Uterine Hæmorrhage.—The value of insulin in the treatment of *menorrhagia of ovarian origin* has recently been emphasized by E. Vogt[1] and G. Cotte.[2] Independently of its action on carbohydrates, insulin in non-diabetic women has the property of diminishing the normal menstrual loss both in duration and amount. This fact has been applied by Vogt as a treatment for menorrhagia due to ovarian dysfunction. By injecting 40 or 50 units daily in two doses before the principal meals, this author is able to obtain arrest of hæmorrhage. The results in the case of fifty patients treated by this method were so constant that if the bleeding was not controlled he did not hesitate to attribute it to uterine rather than ovarian causes. In menorrhagia or metrostaxis associated with such lesions as fibroids or uterine carcinoma, insulin has no effect.

Discussing the rationale of these facts, Cotte points out that normal menstruation is accompanied by a state of hypervagotonia with hyperglycæmia which is balanced by the sympathetic stimulation of the corpus luteum. Insulin may act either by diminishing the hyperglycæmia or by stimulating the vago-sympathetic system. Experiments by L. Haberlandt[3] have shown that it is possible by prolonged injections of insulin temporarily to sterilize rabbits and rats, thus resembling folliculin. Both folliculin and insulin appear to exert a functional antagonism to thyroid, suprarenal, and anterior pituitary extracts in this respect. It appears probable, therefore, that in its action in controlling menorrhagia, insulin exerts this effect by inhibiting or suspending ovulation. It may indeed function as a ferment or vitamin which regulates the cycle of ovulation.

Radium in the Treatment of Uterine Fibroids.—The value of radium in checking hæmorrhage due to fibroids and other benign conditions of the uterus is now fairly established, and treatment on these lines is deserving of wider application. Many uteri can undoubtedly be saved by irradiation therapy which otherwise would have to be removed owing to failure of drug treatment to control severe bleeding. C. F. Burnam,[4] in a paper contributed to the *New Orleans Medical and Surgical Journal*, points out that although the mortality of hysterectomy in good hands is low, it is about ten times that of radiation in the same type of case. In practically every case of fibroids hæmorrhage can be kept in control by radiation, and, if no coexisting infection is present, such treatment is quite safe. According to this author 80 per cent of small fibroids disappear under this form of treatment, and myomectomy should seldom be indicated. The most satisfactory result is obtained when the radium is introduced into the uterine cavity, though good results have been obtained by irradiation from outside. To produce temporary amenorrhœa 500 millicurie-hours are required, and before treatment is instituted diagnosis should be substantiated by curettage and examination under anæsthesia. The post-menstrual period should be selected for the treatment.

It is possible for a patient to become pregnant and give birth to a full-term child after treatment with radium, but in the majority of cases it is necessary to give a full treatment and to produce a permanent cessation of the menses. The symptoms of the artificial menopause are nearly always less in younger women than in those near the menopause. Needless to say, pedunculated growths and fibromyomata undergoing degeneration form exceptions to cases suitable for irradiation, and are best treated by surgery.

Carcinoma of the Uterus. The treatment of uterine cancer has received considerable attention during the past year. At a meeting of the Medical Society of London, Max Cheval,[5] of Brussels, stated that 30 per cent of all cases treated by irradiation were cured. He uses large quantities of **Radium** emitting rays with a wave-length corresponding to a tension of two million volts. Four grammes of radium are placed in the centre of a mass of lead drilled to permit emission of radiations both upwards and downwards. Above and below the radium is a truncated cone with a small opening near the radium and the large end towards the patient. The rays are screened by 1 mm. platinum, 5 cm. aluminium, and 4·5 cm. wood. The minimum distance between the radium and the patient's skin is 12 cm., and the area of skin irradiated is 12 sq. cm.

Important evidence of improvement in the condition of a cancer patient under treatment can be obtained by estimation of the blood-sugar. The blood-sugar in cancer is slightly higher than during health, and the maximum after ingestion of dextrose varies between 0·25 and 0·26 per cent, occurring one hour instead of half an hour after ingestion. After cure by irradiation the blood-sugar curve returns to normal. On the other hand, if improvement only is present, the degree of return of the blood-sugar curve towards normal is a measure of the improvement effected. Indeed, the blood-sugar test will indicate a recurrence before this can be detected clinically.

Malcolm Donaldson observes that radium is the only treatment worthy of the name for inoperable carcinoma. In operable cases the results of radium compared with those of surgery are about equal, but without the considerable immediate mortality of 15·8 per cent attached to the Wertheim operation even under the most skilful hands. Radium is suited to almost every case of carcinoma of the cervix except those with fistulæ. The author's technique is to apply twenty-two needles containing 50 mgrm. of radium element. The needles are left *in situ* for 144 hours. Experience with tissue cultures has shown that more damage is done to the malignant cell by small doses over a long period than large doses for a short period. Donaldson has employed an intra-abdominal technique in the case of ten patients in order to apply the 'gamma' rays directly to the iliac glands. Radium has been left *in situ* in the abdominal cavity for a week, the pelvis being packed with gauze. There had been considerable reaction in these cases, but all ten patients were still alive at the end of two years.

J. E. Lane-Claypon,[6] reviewing the figures obtained by the London Association of Medical Women's Federation over a period extending to five years, says the results of operation and radium are about the same—40 per cent of non-recurrences. In cases which were inoperable when first seen, radium gave an additional 12 per cent of apparent cures. More than half of the patients still continued to present themselves about six to nine months after symptoms had first been noticed and were inoperable when first seen. Indeed only 15 per cent of the total were in a clinically operable stage. The technique of Heyman, of Stockholm, was used for this series. Many Continental clinics use this technique, though in France and Italy that of Regaud seems to be more favoured. J. Heyman[7] claims 20·20 per cent of all his cases to be alive after five years, and 40·5 per cent of his operable cases. Gray Ward[8] and Farrar claim 23·6 per cent of all cases and 52·9 per cent of the operable cases to be alive after five years. As Fletcher Shaw[9] observes, if these figures can be equalled in other countries, then Wertheim's hysterectomy should be abandoned.

P. Werner,[10] reviewing the results of the **Wertheim Operation**, states that the primary mortality in Vienna has been reduced from 10 per cent to 5 or 6 per cent. Of the cases operated upon 50 per cent were alive and well after five years. This corresponds to a permanent healing of 50 per cent of all operable cases, or 25 per cent of the total material in the clinic. Post-operative radiation is used as a routine in all cases operated upon by Werner or his staff.

(*See also* RADIUM AND X-RAY THERAPY.)

REFERENCES.- [1]*Zentr. f. Gynäkol.* 1927, No. 13 ; [2]*Presse méd.* 1918, Feb. 11, 131 ; [3]*Zentr. f. Gynäkol.* 1927, No. 13 ; [4]*New Orleans Med. and Surg. Jour.* 1927, lxxix, 477 ; [5]*Trans. Med. Soc. Lond.* li, 409, 431 ; [6]*Lancet*, 1928, i, 759 ; [7]*Jour. Obst. and Gynæcol. Brit. Emp.* xxxi, 1 ; [8]*Amer. Jour. Obst. and Gynecol.* 1926, xi, 439, and 1925, lxxxv ; [9]*Lancet*, 1927, ii, 538 ; [10]*Surg. Gynecol. and Obst.* 1928, March, 391.

VACCINATION.

J. D. Rolleston, M.D.

SYMPTOMS AND COMPLICATIONS.- The occurrence of *encephalitis and other nervous sequelæ* of vaccination continues to give rise to numerous communications. (*See also* MEDICAL ANNUAL, 1926, p. 509 ; 1927, p. 513 ; 1928, p. 519.) A Committee on vaccination appointed by the Minister of Health in conjunction with the Medical Research Council[1] acquit vaccinia of being the *sole* cause but are unable to exonerate it in playing some part in the causation. They point out that recent histological researches prove that in post-vaccinal nervous disease the lesion of the central nervous system is similar to that found in the nervous sequelæ of the acute exanthemata and bears certain resemblances to the early lesions of disseminated sclerosis. They are of opinion that the co-operation of vaccinia with the viruses of poliomyelitis or of encephalitis lethargica or possibly some unknown neurotropic virus harboured by a vaccinated subject should be retained as a working hypothesis. They recommend that, in place of the officially advocated four insertions, trial should be made of vaccination and revaccination in one insertion with a minimum of trauma, and that multiple scarifications and cross-hatchings should be deprecated. Vaccination in multiple insertions, however, should be available for persons who desired to obtain the maximum possible protection.

J. R. Perdrau,[2] one of the members of the Vaccination Committee, whose observations are based on the study of three fatal cases of post-vaccinal encephalitis, confirms the claim of Turnbull and McIntosh (*see* MEDICAL ANNUAL, 1928, p. 519) that the disease can be distinguished histologically from encephalitis lethargica. He found that post-vaccinal encephalitis was characterized by the presence around certain vessels of the central nervous system of an area of demyelination similar to that found in acute cases of disseminated sclerosis as well as in the nervous sequelæ of small-pox and measles and in the course of anti-rabic inoculation. Perdrau suggests that the agent, living or otherwise, responsible for the demyelination in these various forms of nervous disorder may be the same for all of them.

In view of the frequency of the disease in Holland, it is not surprising that numerous Dutch writers such as J. T. Terburgh,[3] M. Elzas,[4] D. Wiersma,[5] J. P. Bijl,[6] and Jitta[7] have contributed to the subject. Terburgh, who is medical officer of health at The Hague, states that a much larger number of cases have occurred in country districts than in large towns. He does not think that post-vaccinal encephalitis is caused by the vaccine virus or by organisms that gain entrance to the body simultaneously with the vaccine virus, but believes that vaccination rouses into activity a dormant virus which is the cause of encephalitis. Although no Dutch cases had previously been reported before 1924, Elzas states that in 1916, when the whole of Amsterdam was revaccinated owing to a small outbreak of small-pox, a considerable number of persons developed severe pain in the back, abdomen, chest, and sometimes the neck, a fortnight after vaccination. Restlessness and insomnia, indicating involvement of the higher centres, were also noted. Only adults were attacked as a rule, and mainly women. According to Elzas, this condition was probably related to post-vaccinal encephalitis.

Wiersma[5] records 11 cases in children from 4 to 6 years of age, 6 of whom made a complete recovery, and 5 died. The incubation period varied from nine to nineteen days, and was usually eleven or twelve days. Convulsions were present in 5 cases, paralysis of one or more limbs in 3, and convulsions and paralysis in 2. Muscular tonus was low in every case, and very often the tendon reflexes had disappeared. Babinski's sign was very frequent, in contrast with encephalitis lethargica, in which it is very rare. On the other hand, ocular palsies were not observed. The high mortality on the one hand, and the absence of sequelæ in the survivors, were in striking contrast with encephalitis lethargica.

According to Bijl,[6] the number of cases of post-vaccinal encephalitis notified in Holland up to the end of August, 1927, was 124 with 38 deaths. The ages of the patients ranged from a few months to 22 years. [In both the British and the Dutch series, however, cases were comparatively rare in the first year of life.—J. D. R.] Bijl holds that available data do not allow one to say with certainty what virus is the cause of post-vaccinal encephalitis, more facts of a clinical, histological, epidemiological, and experimental kind being required before any definite conclusion can be drawn.

Jitta[7] states that from August to October, 1927, a neurotropic vaccine was used in Holland, the strain of which had been supplied by the Alphonso XIII Institute of Madrid. This vaccine was the only one used in Spain, where more than 2,500,000 vaccinations had been performed with it without any bad effects. Five cases of encephalitis, however, followed its use in Holland, where it also occasionally gave rise to a troublesome local reaction and even generalized vaccinia. In short, strains of lymph of all kinds and from all sources had been used without preventing the appearance of encephalitis.

According to C. Armstrong,[8] *post-vaccination tetanus* tends to follow severe primary vaccinations performed with large insertions and dressed with some type of shield or covering strapped to the site. He found, moreover, that shields or dressings markedly predisposed to post-vaccination tetanus in monkeys or rabbits vaccinated with virus artificially contaminated with *B.*

tetani. He declares that a vaccination in which the insertion is not over an eighth of an inch in its greatest diameter, treated without shields or dressings strapped to the site, has never been followed by tetanus.

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VARICOSE ULCERS.

A. M. H. Gray, M.D., F.R.C.P., F.R.C.S.

TREATMENT.—Considerable attention has been directed recently to the treatment of varicose veins by *intravenous injections of substances which cause obliteration of the veins.* The cure of varicose veins has long been recognized as of great therapeutic importance in the treatment of chronic ulcers of the leg which have, often incorrectly, been labelled 'varicose ulcers'. Sicard,[1] in opening a discussion on this subject before the Royal Society of Medicine, divides ulcers of the leg into four groups: (1) Post-phlebitic ulcers with œdema of the limb he considered quite unsuitable for injection, the only lines of treatment being rest, massage, and support; (2) Dirty serpiginous ulcers of long standing, with marked local dystrophy, were also unsuitable for injection, and could only be treated by rest, disinfection, vaccines, light, and surgery; (3) Ulcers with moderate or mild local disturbance, usually preceded by local dermatitis, were very much improved by sclerosing injections of the veins combined with local applications; (4) Mixed syphilitic and varicose ulcers were cured by antisyphilitic treatment combined with local obliterative injections.

Dora C. Colebrook[2] has made careful *comparison of the rate of healing of 'varicose ulcers' in 68 patients (with 84 ulcers) treated by ultra-violet light and by Unna's paste dressings.* The experiments were carefully controlled, and the following conclusions were drawn: (1) As regards rate of healing, the effect of the light was markedly inferior to that of Unna's paste, the most striking difference showing in the ambulant patients, many of whose ulcers had previously healed only with rest in bed; (2) Favourable changes in general character, which were slight or absent in irradiated ulcers, occurred at an early stage in those dressed with Unna's paste; (3) Relief of symptoms was not obtained during light treatment, but was a marked feature of the Unna cases. The author found it advantageous to incorporate a thin rubber sponge between the bandages in applying the Unna's paste, as it increased the compression produced by the dressing.

REFERENCES.—[1]*Brit. Med. Jour.* 1928, i, 897; [2]*Lancet,* 1928, i, 904.

VARICOSE VEINS AND ULCERS. (*See also* PERIARTERIAL SYMPATHECTOMY.)

Sir W. I. de C. Wheeler, F.R.C.S.I.

Salicylic Acid, Quinine, or **Urethane** solutions are made up in sterile ampoules for injection treatment. These different types are equally satisfactory. The local reaction after injection is a curative one, similar to that occurring in a ligatured vessel; the risk of embolism is consequently not greater.

H. C. McPheeters[1] states that immediately following the withdrawal of the needle a gauze pad should be placed over the needle puncture followed by a tight bandage. The bandage should be left on for two days, and then rebandaged for another two days. This causes adherence of the vein walls and is an important point in the technique.

R. Thornhill[2] uses quinine and urethane (the solution recommended by Genevrier) for preference, owing to the absence of pain. The constituents of the solution are as follows: Urethane 2 grm.; quinine hydrochloride 4 grm.; distilled water 30 c.c.

This is sterilized by boiling, and, as the quinine crystallizes out on cooling, must be immersed in a bowl of hot water before using. During the process the patient remains seated in an arm-chair, which position keeps the veins to be treated in a semi-distended state. The arm-chair is mounted on a dais, which enables one to perform the treatment without having to grovel on the floor. The sitting posture is preferred to having the patient lying on a couch, although this position is quite satisfactory if a tourniquet is used. An ordinary 2-c.c. Record syringe with a No. 17 surgical point is found to be most suitable. At the first treatment it is unwise to inject more than 1 c.c. of the solution, for two reasons: first, the subject is not used to the process and may feel faint, not from any undue pain nor from any action of the solution employed, but purely from nervous causes; and, secondly, to allow for a possible quinine idiosyncrasy. In the few people who possess this anomaly a bitter taste is noticed soon after injection. In such cases a tourniquet is applied and gradually released at the end of the treatment. At subsequent treatments a total amount of 3 c.c. is injected, representing 6 gr. of quinine, which amount rarely causes even a headache. The skin over the vein to be treated is swabbed with ether, which is preferable to iodine or picric acid solution, in that no staining of the skin results and it is therefore easier to distinguish the vessel. The point of the needle is inserted into the lumen of the vein, which is proved by slightly withdrawing the piston, when venous blood will flow freely into the syringe. Half a cubic centimetre is now injected, the needle removed, and a pledget of wool pressed firmly over the puncture for 30 seconds. This process is repeated along the vein at intervals of 1 to 2 in., and 4 to 5 injections are given. Each puncture is then cleaned with ether and sealed with collodion. Patients are required to remain quietly seated for a further five minutes, after which they are free to walk away and continue their normal routine until they are due for the next treatment. The sittings are continued until all the varicosities have been injected.

R. Maingot and C. Hope Carlton[3] describe a simple technique in the injection of varicose veins. The operation must combine simplicity with strict asepsis. It is carried out as follows: The patient is seated on a gynæcological chair or on an ordinary operating table, one end of which is raised as a back rest and the other allowed to hang down behind the patient's dependent legs. The feet may rest upon a stool. In this position the knees are bent at about a right angle and the whole lower extremities are abducted about 40 degrees. When the veins are situated posteriorly the patient stands upon a broad-based stool. In front of him is an assistant upon whose shoulders he leans for support. The operator sits behind him on a low chair. Should the patient feel faint—which is possible, but rare—the assistant can support him and help him to lie down. The skin is cleansed with spirit; no coloured antiseptic can be used as it would mask the veins. The area of operation is isolated with sterile towels. A tourniquet is unnecessary, painful, difficult to handle, and increases the bleeding by augmenting venous congestion. The injection is made with a 5-c.c. Record syringe to which is fitted a fine hypodermic needle; both are sterilized overnight in spirit and are rinsed in sterile water before use. The needle of the charged syringe is inserted through sound skin and pushed on through healthy tissues for a centimetre. It is never allowed to pierce the vein directly; the point must always traverse sound skin and healthy connective tissue before entering the vein. In this way a valve-like puncture is produced, and post-operative backflow extravasation is rendered unlikely. It is this backflow which produces post-operative pain, discoloration, and patches of necrosis leading to ulceration. *The next step is for the operator to satisfy himself beyond any doubt whatever that the point of the needle is actually within* *the lumen of a vein.* When blood appears in the syringe on withdrawing the plunger the injection is proceeded with. The fluid should be injected at the rate of 1 c.c. in 5 seconds. A faster rate may cause painful spasm or even rupture of the vein. If pain is caused the needle is withdrawn and inserted at another point. As a general rule the injection is made in the direction of the blood flow, which is from the trunk toward the extremities when the limbs are vertical. The amount of fluid introduced at each puncture varies from ½ to 5 c.c. according to the size of the vein. Not more than 15 c.c. should be given at one sitting. As a rule, three sittings are necessary for each patient; fewer may suffice to produce thrombosis in small varices, and more may be necessary for very large tortuous veins involving a whole limb. A piece of adhesive strapping the size of a postage stamp seals the puncture when the needle is withdrawn. If several punctures have been made, a crêpe bandage or a flannel bandage cut on the bias is applied, to give comfort, protection, and support. After the operation the patient is encouraged to walk about the room and is advised to continue his usual occupations, although violent exercise should be avoided for a week. Post-operative elevation of the limb is definitely contra-indicated.

The general effect is most gratifying in the majority of patients. Often they are so pleased that they want to have more injections at once, although prudence advises the operator to wait for the results of the first treatment before proceeding. The increased sense of well-being is especially marked in women whose handicap has been so great as to make them do as much of their housework as possible sitting down with their legs up. Most of those treated have returned to work and continued in active occupations. Among the general ill effects noted in this series were giddiness, fainting, tinnitus, and, in women, general abdominal pain, especially after quinine.

After a successful injection the vein sometimes dilates, but usually contracts and loses its blue colour immediately. An hour later it is once again prominent. On the succeeding day it is hard and thrombosed to an extent which varies directly with the amount of solution injected. There may be a feeling of fullness, but this passes off on walking about. The limb may be stiff for a few days, but this, like the cramp and joint pains of which patients often complain, passes off. The limb diminishes in size and its natural contour is restored, and after six months only the fibrous strands of the veins remain. These strands are most easily felt and persist longest over the subcutaneous surface of the tibia; they disappear rapidly where supported by muscle, as in the calf.

Some patients complain of a burning sensation at the time of injection; the solution—especially sodium salicylate—must not be injected too forcibly or pain and severe cramp may result. Fully half the patients complained of tenderness of the limbs for several days after operation. This is no doubt due to a mild inflammation concurrent with obliteration of the lumen. About 10 per cent of patients showed discoloration or pigmentation round the area of injection. This may take months to disappear, and is probably due to perivenous leakage, as it occurred most commonly in those cases which bled at the time of injection.

Fatality following Varicose Veins Injection.—O. A. Olson[4] reports the case of a woman, age 33, who received two injections of salt solution and calorose. She dropped dead whilst playing with her children five days after the second injection. The post-mortem examination indicated (1) varicose veins, (2) phlebitis and thrombosis of the right internal saphenous vein, (3) pulmonary embolism.

Tannic Acid Treatment of Varicose Ulcers.—Carrell[5] has had striking results from the use of **Tannic Acid** solution in the treatment of varicose ulcers. After the ulcerated area has been rid of infection, it and the surrounding skin are cleansed with alcohol and dried ; then, with an ordinary nasal spray, a 2·5 per cent solution of tannic acid is sprayed on every half hour until the ulcer is well crusted over. A fair crust will be formed in ten or twelve hours. Contracture of the crust will cause frequent cracking, but the fissures are readily covered by additional spraying. No dressing is necessary after the treatment is begun. The crust formed is of hardened tissue of the base of the ulcer and not of hardened secretions. After several days of this treatment a serous secretion forms under the crust, but this is no indication for removal of the crust unless it becomes infected. As the epithelial margin moves centrally under the crust, the latter will become loosened and break off. Undue haste in removing the crust will tear away sections of the new epithelium. When ultra-violet-ray therapy is also used, care must be taken lest the new epithelium receive too heavy a dosage. The end-results are said to be very gratifying.

REFERENCES.—[1]*Surg. Gynecol. and Obst.* 1927, Oct., 541 ; [2]*Practitioner*, 1928, Jan., 54 ; [3]*Lancet*, 1928, i, 806 ; [4]*Jour. Amer. Med. Assoc.* 1927, ii. 692 ; [5]*Ibid.* 1902.

VASCULAR SURGERY. (*See also* ANEURYSM ; HEART INJURIES ; PERIARTERIAL SYMPATHECTOMY ; TUBERCULOSIS OF BONES AND JOINTS ; VARICOSE VEINS.)

Sir W. I. de C. Wheeler, F.R.C.S.I.

Periarterial Sympathectomy.—The indications and contra-indications have been discussed in the MEDICAL ANNUALS of 1927, p. 516, 1928, p. 523, and in this volume on p. 338. The reviewer has under his care a woman aged about 50, with high blood-pressure. Dry gangrene is established in the great toe and threatening in the second toe. The femoral artery was exposed in Hunter's canal. The atheromatous condition of the vessel prevented the denudation of the arterial wall after the method of Leriche. The Sampson Handley alternative was adopted. Three or four drops of **Alcohol** were injected with a very fine needle into the adventitious coat which carries the sympathetic nerve-supply. The operation was followed by a marked change in the foot. The patient herself became conscious of the vasodilatation by feeling the increased warmth. At present it appears likely that the second toe will survive, and that the spread of the gangrene from the first will be prevented.

Sampson Handley[1] discusses the treatment of *gangrene* with especial reference to periarterial sympathectomy. He points out that after Leriche's operation the vasodilator reaction is transitory and disappears in three or four weeks. Leriche does not recommend his operation for actual senile gangrene, but for incipient gangrene it is indicated if examination shows that the arteries are still dilatable. Leriche suggests that in order to minimize the risk of gangrene in cases in which the main artery of a limb has to be ligatured, as for aneurysm, the artery, instead of being simply tied, should be divided between two ligatures. Simple ligation is followed by dangerous vasoconstriction lasting some hours ; resection of the artery produces immediate and lasting vasodilatation. Sampson Handley justly points out that by his method of **Alcohol** injection threatened gangrene or the spread of senile gangrene may be averted, or at all events a low amputation substituted for a high one. The femoral artery in Hunter's canal is exposed, and with the finest obtainable hypodermic needle, 2 to 3 min. of alcohol are injected at four points spaced out round the calibre of the artery. The needle is introduced obliquely and nearly parallel with the artery. When the injection is complete, a whitish band half an inch wide is seen around the artery, but no vasoconstriction takes place. In successful cases the vasodilatation produced by alcohol injection is immediate ; there is no initial period of vasoconstriction such as follows sympathectomy.

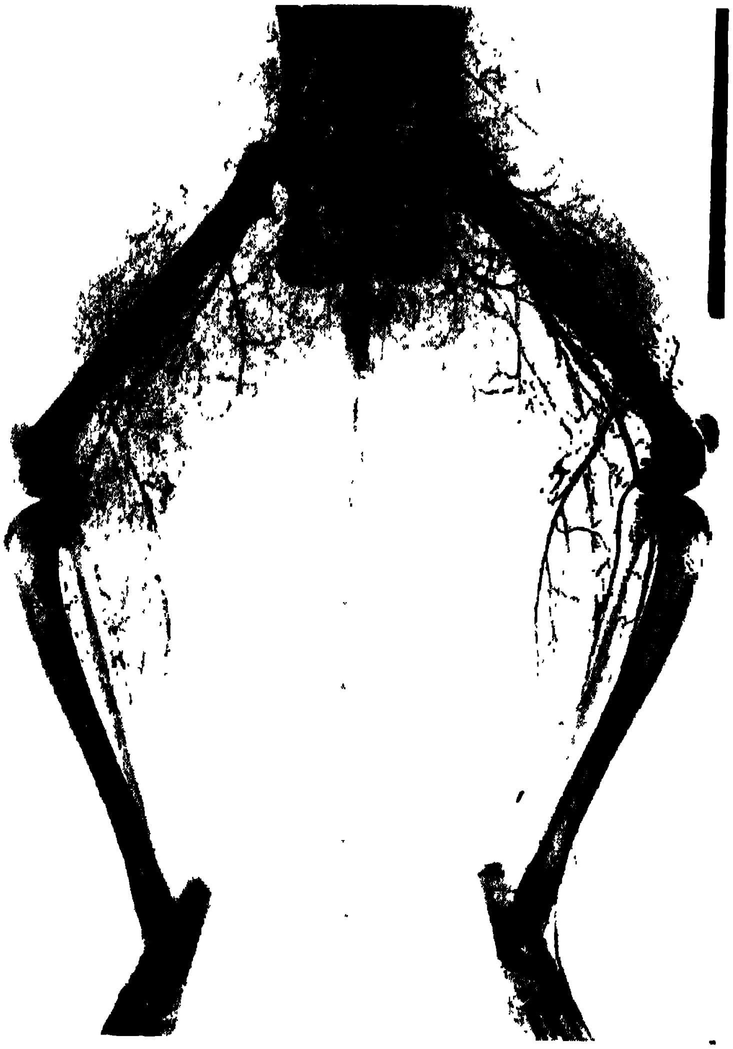
R. Brooke[3] recommends periarterial sympathectomy with ligature of the femoral vein for diabetic gangrene. Heretofore high amputation was the treatment employed for this form of gangrene; low amputation usually was followed by disaster. Gangrene temporarily checked in its progress by insulin may lead to a sense of false security. The action of insulin can only be a transient one, and cannot materially affect the course of the gangrene. Insulin should of course be used as a pre-operative measure to reduce the blood-sugar. Brooke recommends that the adventitia should be stripped off the femoral artery in Hunter's canal after the method of Leriche, and that the femoral vein should be ligatured in two places. In the first case treated in this manner the dorsalis pedis, plantar, tibial, and popliteal pulses were absent before operation, and on the day following operation were not only palpable but of distinctly greater volume than those of the opposite side. This increase in pulse volume persisted for about twelve days and then appeared to decrease. [According to Sampson Handley, after alcohol injection late diminution does not occur.— W. I. de C. W.] The gangrenous portion became dry and mummified after a period of five weeks, and separated from the rest of the foot three weeks later. In this very interesting communication Brooke points out that there are some cases of diabetic gangrene which terminate fatally with rapidly progressing gangrene of one or both limbs in the course of forty-eight to seventy-two hours. In such cases the spread of the gangrene is so rapid, even with insulin therapy, that operative measures cannot be undertaken with success. To sum up, in diabetic gangrene there should be: (1) A short preliminary course of insulin therapy; (2) Local treatment in the form of radiant heat baths; (3) Early operation -the operation of choice being periarterial sympathectomy of the femoral artery in Hunter's canal, with ligation of the femoral vein; (4) After an interval of from five to ten days, low amputation.

[The reviewer has under his care at present a case which illustrated a further indication for periarterial sympathectomy, or the injection of alcohol, or both combined. The patient, age 62, developed a diffuse popliteal aneurysm after a very slight injury. The tumour was about the size of a cocoanut, and was gradually extending upwards along the course of the popliteal artery through the opening in the abductor magnus. The patient was a bad surgical risk. He was excitable and nervous; his blood-pressure at one time was 220; his pulse-rate ranged from 120 to 140, and his heart was fluttering and fibrillating; he was fat and short-necked. There were many problems to consider in this case. The gradually increasing size of the tumour was leading to obstruction of the circulation below. The foot was cold and gangrene was impending. The ideal treatment would have been to apply a tourniquet, to lay open the aneurysm, and to close the vessels either by suture inside after the manner of Matas, or, having found the vascular openings inside the sac, by passing a probe through them as a guide to apply a ligature. The general condition of the patient forbade such a procedure under a general or spinal anæsthetic. Ligature of the femoral artery would almost certainly have been followed by gangrene; amputation would in all probability have been fatal. The patient was given ¼ gr. of morphia. With local anæsthesia the femoral artery was exposed in Hunter's canal, just above the aneurysm. One inch of it was resected in order to combine the effects of ligature with an effective form of sympathectomy. In order to prevent the possibility of early vasoconstriction, alcohol was injected into the adventitious sheath both proximally and distally above and below the two ligatures. The femoral vein was ligated. This procedure was followed by a cessation of pulsation in the tumour and did not interfere with the blood-supply of the foot. The circulation was still sluggish,

PLATE LX

LIGATURE OF BOTH ARTERY AND VEIN

(H. E. PEARSE, JUN.)



The vascular bed two weeks after ligation of the artery and vein (on the side with the marker) compared with that after ligation of the artery alone.

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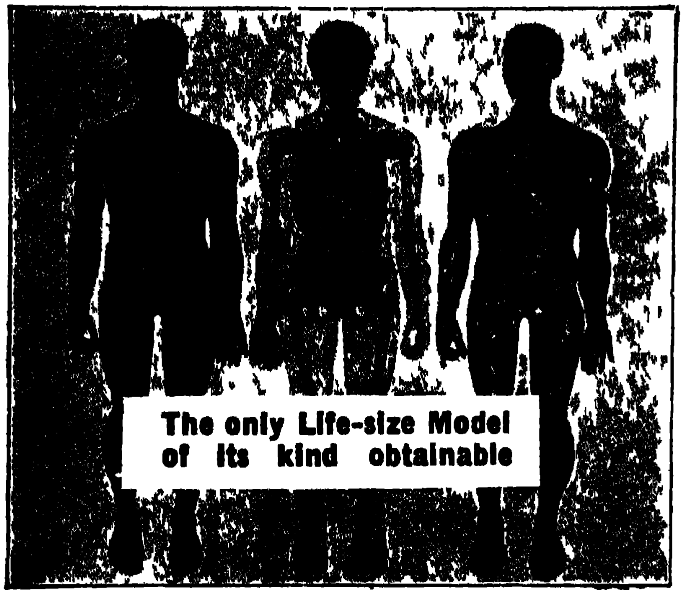

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Scottish Amicable Life Assurance Society, St. Vincent Place, Glasgow. *Gen. Man.*, W. Hutton. *Sec. and Act.*, R. Gordon-Smith. London, 17, Tokenhouse Yard, E.C.2. *Sec.*, F. K. Fenton .. M	1826	51/9	66/3	90/1	9,598,445
Scottish Equitable Life Assurance Society, 28, St. Andrew Square, Edinburgh. *Gen. Man.*, C. Guthrie. *Sec.*, A. H. Lough. London Office, 13, Cornhill, E.C.3. *Sec.*, P. W. Purves. (*Premiums cease at age* 75) .. .. M	1831	50/6	67/6	97/-	*8,157,122
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THE CANCER REVIEW

A JOURNAL OF ABSTRACTS

ISSUED UNDER THE DIRECTION OF THE

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ESTABLISHED in 1926, the ideal aimed at in this REVIEW is to include an abstract of every publication in any language whether issued in the form of a book or monograph, or that of an article appearing in any of the current periodicals—bearing upon the problems of cancer research in the widest sense. The abstracts are grouped under the following general headings: (1) General; (2) Experimental and Biochemical; (3) Clinical and Pathological; (4) Radiological; (5) Statistical.

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School Secretary : **R. A. FOLEY.**

Ad. 4

ST. MARY'S HOSPITAL MEDICAL SCHOOL

(University of London)

SESSIONS 1929-1930.

Terms begin on Oct. 1st, 1929; Jan. 2nd, 1930; April 29th, 1930.

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Numerous appointments are open to newly-qualified members of the Medical School. Six House Physicians (eight months), Eight House Surgeons (eight months), and Four Resident Obstetric Officers (six months) are appointed annually. Two Resident Anæsthetists (six months), £150 per annum, Four Casualty House Surgeons (six months), £100 per annum, with board and residence. Medical Registrar and Surgical Registrar, £200 per annum, with partial board.

In addition to the above, Five Assistants to the Medical and Surgical Units are appointed from time to time, with salaries ranging from £400 to £750 per annum.

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The Fee for the Amalgamated Club is 3 guineas per annum.

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The Illustrated Prospectus of the Medical School may be obtained on application to the Secretary, St. Mary's Hospital Medical School, Paddington, W.2.

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MEDICAL SCHOOL,
(University of London),
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DEAN: PROFESSOR L. S. DUDGEON, C.M.G., C.B.E., F.R.C.P.

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The institution of CLINICAL MEDICAL AND SURGICAL UNITS offers special advantages to those desiring advanced instruction and practice in these Subjects. The Units' Laboratories are fully equipped for the routine investigation of disease and for research work.

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The SPECIAL DEPARTMENTS IN THE HOSPITAL provide clinical instruction in all special Subjects.

SPECIAL CLASSES are held for the F.R.C.S., Primary and Final, and other higher Examinations.

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THE MEDICAL SECRETARY, ST. THOMAS'S HOSPITAL MEDICAL SCHOOL,
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ST. JOHN'S HOSPITAL

For Diseases of the Skin

(INCORPORATED).

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OFFICES AND OUT-PATIENT DEPARTMENT—
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The OUT-PATIENT DEPARTMENT contains Laboratory, Lecture Room, Electrical Department and Medicated Vapour Baths.

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TUESDAY ..	2 p.m.	DR. GOLDSMITH	6 p.m.	DR. WIGLEY
WEDNESDAY ..	2 p.m.	DR. DOWLING	6 p.m.	DR. WIGLEY
THURSDAY ..	2 p.m.	DR. SIBLEY	6 p.m.	DR. GOLDSMITH
FRIDAY ..	2 p.m.	DR. ROXBURGH	6 p.m.	DR. DOWLING
SATURDAY ..	2 p.m.	MEDICAL REGISTRAR		

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S. ERNEST DORE, M.D., F.R.C.P. ..	St. Thomas's, Westminster and St. John's Hospitals
G. B. DOWLING, M.D., M.R.C.P. ..	West London & St. John's Hospitals
J. A. DRAKE, M.D., F.R.C.P. ..	King's College Hospital
WILFRID FOX, M.D., F.R.C.P. ..	St. George's & St. John's Hospitals
W. N. GOLDSMITH, M.D., M.R.C.P. ..	St. John's Hospital
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A. C. ROXBURGH, M.D., *Dean.*

COUNTY OF LONDON.

Maudsley Hospital

DENMARK HILL, S.E.5.

Medical Supt. - **EDWARD MAPOTHER, M.D., F.R.C.P., F.R.C.S.**

THIS HOSPITAL, organized by the London County Council on the lines of the combined Neurological and Psychiatric Clinics of the Continent and America, represents the first provision of its kind by a public body in this country. Its objects are :—

(*a*) Research into the pathology and treatment of Nervous and Mental Disorders;

(*b*) Instruction of Medical Students and advanced post-graduate courses in Psychological Medicine;

(c) Facilities for diagnosis of difficult cases;

(*d*) **TREATMENT** of all forms of Nervous Disorders (both organic and functional), including early and recoverable forms of mental disturbance.

Admission as in-patients of the psychoses is limited to those of good prognosis, except in very special cases for diagnosis or of particular value for research or teaching.

Approval by the Medical Superintendent is an indispensable preliminary.

Treatment is entirely on a voluntary basis. Every in-patient is required to sign an application form for admission, and is entitled to leave within 24 hours of notifying desire to do so. Restriction of liberty while in Hospital is reduced to a minimum.

The special features of treatment at this Hospital for mental disturbances include (1) Complete absence of association with the certified insane and of the stigma connected with this; (2) Careful separation from admission of the quiet from restless cases; (3) A Medical Staff sufficiently numerous for modern individual psycho-therapy; (4) All means of physical treatment; (5) The services of eminent specialists in various branches of medicine and surgery; (6) The co-operation of a Pathological Department under Dr. F. L. GOLLA, ensuring application of the most modern methods; (7) A very numerous, highly educated, and experienced nursing staff, almost entirely women.

OUT-PATIENTS are seen at 2 p.m. (Men on Mondays and Thursdays, Women and Children on Tuesdays and Fridays). All types of nervous and mental disorder are eligible for treatment in this Department.

IN-PATIENTS: Accommodation includes—

(*a*) 164 Beds (both sexes) in wards or separate rooms.

(*b*) 13 Private rooms (for Ladies) with special sitting rooms, garden, and dietary.

TERMS:

(*a*) **£5** a week, but in case of patients with a legal settlement in the County of London a less sum may be charged according to means.

(*b*) **£6 6s.** a week.

All communications should be addressed to the *Medical Superintendent.*

MONTAGU H. COX, *Clerk of the London County Council.*

FOUNDED
1866.

BEDS
85.

Free and Paying Patients received in both In- and Out-Patient Departments. The latter is open every week-day except Saturday at 2 p.m.

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PARALYSIS

and other Diseases of the Nervous System

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Pathological Laboratory.
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Surgeons.—C. J. Ogle, Esq., M.R C.S.; W. Ernest Miles, Esq., F.R.C.S.; Peter L. Daniel, Esq., F.R.C.S.; P. Maynard Heath, Esq., M.S., F.R.C.S.

Assistant Surgeon.—A. Lawrence Abel, Esq., M.S., F.R.C.S.

Anæsthetists.—F. J. Lawson, Esq., M.B.; Howard Jones, Esq., M.B.; F. de Caux, Esq., M.B.

Resident Medical Staff.—One House Surgeon.

Matron.—Miss Ida Symonds.

Operations Tuesdays, Wednesdays, and Thursdays. The practice of the Hospital is free to Medical Men and Students. Out-patients seen on Mondays, Tuesdays, Wednesdays, Thursdays, and Fridays at 2 p.m. *Tuesdays at 8 p.m.* All treatment is free. In-patients pay according to their means for maintenance. **PRIVATE WARDS.**

A chief feature of the Hospital is to provide for sufferers whose means are unequal to the cost of private treatment, and who yet are not fit subjects for a Free Hospital.

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SCHOLARSHIPS AND PRIZES. Entrance Scholarships open to Students of the Universities of Cambridge and Oxford: (1) £100 in Pathology; (2) £75 in Anatomy and Physiology. The Examinations for the Scholarships are held in (1) July, and (2) September. Numerous other Scholarships and Prizes amounting to £725 are awarded annually in all subjects of the curriculum.

FEES. An Entrance Fee of 10 Guineas, and an Annual Fee of 40 Guineas, which includes all classes and lectures.

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(Men Students only are eligible for admission.)

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MILE END, E.1.

KING'S COLLEGE HOSPITAL MEDICAL SCHOOL

(UNIVERSITY OF LONDON)

DENMARK HILL, LONDON, S.E.5.

DEAN: H. WILLOUGHBY LYLE, M.D., B.S. (Lond.), F.R.C.S., J.P.

King's College Hospital (planned to contain **600** beds) is equipped with the most modern appliances. It is easily reached from all parts of London

Complete Training is provided in all subjects for Medical Degrees and Diplomas.

The Hall of Residence is near the School; also **The Athletic Ground.**

Two Raymond Gooch Scholarships (£120 each), **Two Burney Yeo Scholarships (£80** each), and **Four Entrance Scholarships** (total value **£225**), for University Students, will be offered during 1929.

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The Calendar will be sent on application to the Secretary: S. C. RANNER, M.A. (Cantab.),
KING'S COLLEGE HOSPITAL MEDICAL SCHOOL, DENMARK HILL, LONDON, S.E.5

ROYAL DENTAL HOSPITAL OF LONDON

SCHOOL OF DENTAL SURGERY (University of London),

Leicester Square, LONDON, W.C.2.

Students are admitted for the curriculum for the B.D.S. Degree and the L.D.S. Diploma.

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Classes are held during the Winter and Summer Sessions and are open to Students who have not yet commenced their Professional Study.

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The School is thoroughly equipped. The **CLINIC** of the Hospital is **UNRIVALLED**

For further particulars apply to The Dean.

UNIVERSITY OF BRISTOL.

FACULTY OF MEDICINE.

THE University affords complete courses of instruction for its own examinations, those of the University of London, and those of the Conjoint Board, etc., for Medical Degrees or Diplomas. The Dental Department affords the necessary instruction for the Degrees and Diploma of the University and of other examining bodies in that subject.

The University confers the following Degrees and Diplomas:

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MASTER OF SURGERY	Ch.M.
DOCTOR OF MEDICINE	M.D.
DOCTOR OF PHILOSOPHY	Ph.D.
BACHELOR OF DENTAL SURGERY	B.D.S.
MASTER OF DENTAL SURGERY	M.D.S.
DIPLOMA IN DENTAL SURGERY	L.D.S.
DIPLOMA IN PUBLIC HEALTH	D.P.H.

The early part of the curriculum so interlocks with the curriculum for the B.Sc. that the Medical student may without much loss of time take also the degree of B.Sc. Moreover, the Dental student may in seven years take both Dental and Medical degrees. The whole of the Dental Mechanical work for the Bristol Royal Infirmary and the Bristol General Hospital is done in the University laboratory by the students, instructed by skilled mechanics.

CLINICAL WORK is done at the Bristol Royal Infirmary and the Bristol General Hospital, which together contain 628 beds. The Bristol Royal Hospital for Sick Children and Women (100 beds), the Bristol Eye Hospital, the Bristol City and County Asylum, and the Bristol City Fever Hospital are also open for the clinical instruction of students

SCHOLARSHIPS.—There is no entrance scholarship, but students from the City of Bristol may, on their merits, receive financial aid from the City Scholarship Fund on application to the Director of Education, Guildhall, Bristol. Forms of application must be returned to him by April 30th.

Several Scholarships and Prizes are open to students during their Hospital career.

HOSPITAL APPOINTMENTS open to students after qualification.

At the Bristol Royal Infirmary.—Two House Surgeons, two House Physicians (of these one is chosen as Senior Resident Officer), one Resident Obstetric Officer, one Throat, Nose and Ear House Surgeon, one Ophthalmic House Surgeon, one Casualty Officer, and one Dental House Surgeon.

At the Bristol General Hospital.—One Senior House Surgeon, one Casualty House Surgeon, two House Physicians, one House Surgeon, and one Dental House Surgeon. All these appointments are salaried, with board and residence.

For further particulars and prospectus apply to the DEAN of the Faculty of Medicine.

UNIVERSITY OF EDINBURGH

Principal—SIR J. ALFRED EWING, K.C.B., M.A., D.Sc., LL.D., F.R.S.

The SUMMER SESSION, 1929, opens on 16th April, and closes on 28th June.
The WINTER SESSION, 1928-29, opens on 2nd October (3rd, 4th and 5th yrs.), on 9th October, (1st and 2nd years), and closes on 15th March.

FACULTY OF MEDICINE.

Dean—PROFESSOR J. LORRAIN SMITH, M.A., M.D., LL.D., F.R.S.

The Faculty embraces 19 Professors and 80 Lecturers, and attached to these there are about 40 Assistants and Demonstrators. Instruction is given in all the main branches of Medical Science, viz.:—

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Botany—Wm. Wright Smith, M.A., F.R.S.
Anatomy—Arthur Robinson, M.D.
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Clinical Surgery—Geo. L. Chiene, M.B., C.M.; W. J. Stuart, M.B., Ch.B.; J. W. Struthers, M.B.; Henry Wade, M.D.; J. M. Graham, Ch.M.
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Clinical Midwifery—R. W. Johnstone, M.D.; William Fordyce, M.D.; James Young, M.D.; H. S. Davidson, M.B.; Douglas Miller, M.D.; W. F. T. Haultain, M.B.; E. C. Fahmy, M.B.
Diseases of the Eye—A. H. H. Sinclair, M.D.; H. M. Traquair, M.D.; E. H. Cameron, M.B.; C. W. Graham, M.B.
Clinical Instruction in Diseases of Children—Chas. McNeil, M.D.; N. S. Carmichael, M.B., Ch.B.; L. H. F. Thatcher, M.D.; Gertrude Herzfeld, M.B.; Norman Dott, M.B.
Anatomy—E. B. Jamieson, M.D.
Applied Anatomy—F. E. Jardine, M.B.
Histology—May L. Walker, M.A., B.Sc., M.B.
Physiological Chemistry—W. W. Taylor, D.Sc.
Experimental Physiology—H. Dryerre, Ph.D.
Physiology of the Nervous System—A. Ninian Bruce, M.D., D.Sc.
Experimental Pharmacology—(Vacant).
Materia Medica—A. C. White, M.B., Ph.D.
Pathology—R. D. Mackenzie, M.B.; Theodore Rettie, D.Sc.
Morbid Anatomy—J. Davidson, M.B.
Bacteriology—D. G. S. McLachlan, M.B.
Physics—G. A. Carse, M.A., D.Sc.
Chemistry—Edgar Stedman, B.Sc., Ph.D.
Diseases of the Larynx, Ear and Nose—John S. Fraser, M.B.; J. D. Lithgow, M.B.; W. T. Gardiner, M.B.; G. Ewart Martin, M.B.
Tropical Diseases—Lt.-Col. E. D. W. Greig, C.I.E., M.D.
Medical Entomology and Parasitology—J. H. Ashworth, D.Sc., F.R.S.
Tropical Hygiene—J. du P. Langrishe, D.S.O., M.B.
Sanitary Administration—Wm. Robertson, M.D.
Diseases of the Skin—Frederick Gardiner, M.D.; R. Cranston Low, M.D.; Robert Aitken, M.D.
Clinical Instruction in Infectious Fevers—W. T. Benson, M.D.; Alexander James M.D. [M.D.
History of Medicine—J. D. Comrie, M.A., B.Sc.,
Surgical Pathology—K. Paterson Brown, M.B.
Venereal Diseases—David Lees, D.S.O., M.B.
Psychology—James Drever, M.A., B.Sc., D.Phil.
Radiology—J. M. Woodburn Morison, M.D., D.M.R.E.
Neuro-Pathology—F. E. Reynolds, M.B.
Psychiatry—Wm. McAlister, M.B.
Clinical Experimental Methods—(Vacant).

Practical Instruction is afforded, under the superintendence of the Professors, in Laboratories with the necessary appliances, and in Tutorial and Practical Classes connected with the above Chairs, and opportunities are afforded to Students to extend their practical knowledge and engage in original research. Opportunities for Hospital Practice are afforded at the Royal Infirmary, the Hospital for Sick Children, Maternity Hospital, the City Fever Hospital, and the Royal Edinburgh Hospital for Mental Disorders. Upwards of 2760 beds are available for the Clinical Instruction of Students of the University. Four Degrees in Medicine and Surgery are conferred by the Univ. of Edinburgh, viz.: Bachelor of Med. (M.B.), Bachelor of Surg. (Ch.B.), Doctor of Med. (M.D.), and Master of Surg. (Ch.M.). The minimum Class Fees for M.B. and Ch.B., including Hospital Fee (£12), amount to about £210, and the Matric. and Exam. Fees to £45 3s. An additional Fee of £21 is payable by those who proceed to M.D., and £21 by those who proceed to Ch.M. The annual value of the Bursaries, Prizes, Scholarships, and Fellowships in the Faculty of Med. amounts to about £3,600, and that of the other Bursaries, etc., tenable by Students of Med., amounts to about £1,820.

POST-GRADUATE INSTRUCTION.—Courses of instruction are given for the University Diplomas in Public Health, Tropical Medicine and Hygiene, Psychiatry, and Radiology. These Diplomas are open to approved registered practitioners as well as to graduates in Medicine and Surgery of the University.

The University also takes part in the Courses given under the auspices of the Edinburgh Post-Graduate Courses in Medicine. In the departments of the Faculty of Medicine, provision is made for research by students of graduate standing.

In the University Laboratories facilities will be provided for candidates for the Degree of Ph.D. whose applications to engage in research have been accepted by the Senatus.

A Syllabus and further information as to Matriculation, the Curricula of Study for Degrees, etc., may be obtained from the Dean of the Faculty of Medicine; and for Degrees in the Faculties of Arts, Science, Divinity, Law, and Music, from the Deans of these Faculties, or from the Secretary; and full details are given in the University Calendar, published by James Thin, 55, South Bridge, Edinburgh. Price by post, 6s.

By Authority of the Senatus,
W. A. FLEMING, *Secretary.*

UNIVERSITY OF MANCHESTER

FACULTY OF MEDICINE.

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The Clinical Instruction is given in the new Royal Infirmary opened in 1909 on a site near to the Medical School. It is provided with every modern requirement for the treatment of the sick and the investigation of disease. Instruction in Special Subjects is given in other Hospitals associated with the University. A large number of beds in the General and in the Special Hospitals are available, thus affording unrivalled opportunities for Clinical Study

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7. Special Hospitals for Diseases of the Ear, Throat and Chest, Skin, and the Christie Cancer Hospital about	252 Beds
8 Dental Hospital of Manchester	
9. Ancoats Hospital	.. 120 Beds
10. Salford Royal Hospital	.. 260 Beds

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Fellowships, Scholarships, &c., are also offered for Competition to Students of the Faculty.

Residence for Undergraduates.—There are Halls of Residence both for Men and for Women Students. Lodgings can also be recommended. Full information can be obtained from the Dean of the Medical School.

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(SCOTLAND).

Chancellor - Vacant.

Rector—SIR WILFRED THOMASON GRENFELL, K.C.M.G., M.D., F.R.C.S.

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(*Dean*—F. J. CHARTERIS, M.D.)

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PRELIMINARY EXAMINATION. September and March. Entries due 15th August and 13th February.

PRE-REGISTRATION EXAMINATION. (Physics and Chemistry) September, December, and June. Entries due 31st August, 7th November, 8th May.

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. . THE . .

UNIVERSITY OF LIVERPOOL

FACULTY OF MEDICINE.

The University grants degrees in Medicine, Surgery, Hygiene, Orthopædic Surgery, Dental Surgery, and Veterinary Science, also degree of Doctor of Philosophy, and Diplomas in Public Health, Tropical Medicine, Tropical Hygiene, Veterinary Hygiene, Medical Radiology and Electrology, and a Licence in Dental Surgery. Students may also prepare in the University for the examinations of other licensing bodies.

Medical School Buildings.—The buildings of the Medical School are all modern, and contain spacious lecture rooms, and well-equipped laboratories and class-rooms for the study of all the more important subjects which form the basis of medicine. In addition, laboratories are provided for medical research in Bio-chemistry, Tropical Medicine, Physiology, Comparative Pathology, Pathology, Bacteriology, Hygiene, and Cytology.

Hospitals.—The Clinical School consists of four general hospitals—the Royal Infirmary, the David Lewis Northern Hospital, the Royal Southern Hospital, and the Stanley Hospital; and of five special hospitals; the Eye and Ear Infirmary, the Hospital for Women (including the Samaritan Hospital), the Royal Liverpool Children's Hospital, St. Paul's Eye Hospital, and Liverpool Maternity Hospital. These hospitals contain in all a total of over 1500 beds.

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Founded 1494.

FACULTY OF MEDICINE.

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Practical Classes are conducted by the Professors, Lecturers, and Assistants in Laboratories furnished with all necessary appliances; and facilities are afforded to Students and Graduates to extend their practical knowledge and to engage in original research.

Instruction is also given in special departments of Medical Practice by Lecturers appointed by the University Court.

Clinical instruction is obtained in the Royal Infirmary, the Royal Hospital for Sick Children, the City (Fever) Hospital, the General Dispensary, Maternity Hospital, Vaccine Institutions, Ophthalmic Institutions, and the Royal Mental Hospital.

Bursaries, Scholarships, Fellowships and Prizes, to the number of 56 and of the Annual Value of £1200, may be held by Students in this Faculty.

The cost of Matriculation, Class and Hospital Fees for the whole curriculum, inclusive of the fees for the Degrees, is approximately £242.

A Prospectus of the Classes, Fees, &c., may be had on application to the Secretary, and full particulars will be found in the University Calendar published by the Aberdeen University Press Ltd.

H. J. BUTCHART, *Secretary.*

Royal College of Surgeons of Edinburgh

(INCORPORATED 1505.)

Copies of the Regulations for the Fellowship, Licence, Higher Dental Diploma, and Licence in Dental Surgery, with dates of Examinations, may be had on application to—

MR. D. L. EADIE, 49 LAURISTON PLACE, EDINBURGH, *Clerk of the College.*

Medical and Dental Students must state date of Registration.

ROTUNDA HOSPITAL
DUBLIN.

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In addition there is a large antenatal clinic and an Infants' department where students are encouraged to attend. The Pathological Laboratory is open to the Class, and the X-Ray plant adds greatly to the Hospital.

Qualified Students are given facilities for following and observing all abnormal cases in the hospital or district, and are allowed, so far as possible, to assist at gynæcological operations.

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(FOUNDED 1505)

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WINTER SESSION, 1929-30, opens 8th OCTOBER.

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Full particulars can be obtained from **DR. MAURICE DAVIDSON,** *Dean.*

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UNIVERSITY OF BIRMINGHAM

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(Associated with the General, Queen's and Special Hospitals for Clinical Teaching.)

THE NEXT SESSION OPENS IN OCTOBER, 1929.

The University grants Degrees in Medicine, Surgery and Public Health, and a Diploma in Public Health; also Degrees and a Diploma in Dental Surgery.

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SCHOLARSHIPS, EXHIBITIONS AND PRIZES.

Entrance and other Scholarships and Exhibitions, and various Prizes and Medals are awarded annually in the Faculty of Medicine.

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Inquiries and applications to join above Courses should be addressed to Dr. MacIntyre, Medical Superintendent, Plaistow Hospital, E.13. The Superintendent can also be seen at the Hospital on week-days by appointment.

The Hospital is situated near Upton Park Station, to which frequent trains run on the District and Midland Railways.

Telephone—
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Further particulars may be obtained from the Secretary or the Dean.

ERIC I. LLOYD, F.R.C.S., *Dean of the Medical School.*

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F.R.C.S.(Edin.), 1918-28 .... **39**
M.R.C.P.(Lond.), 1914-28 .... **152**
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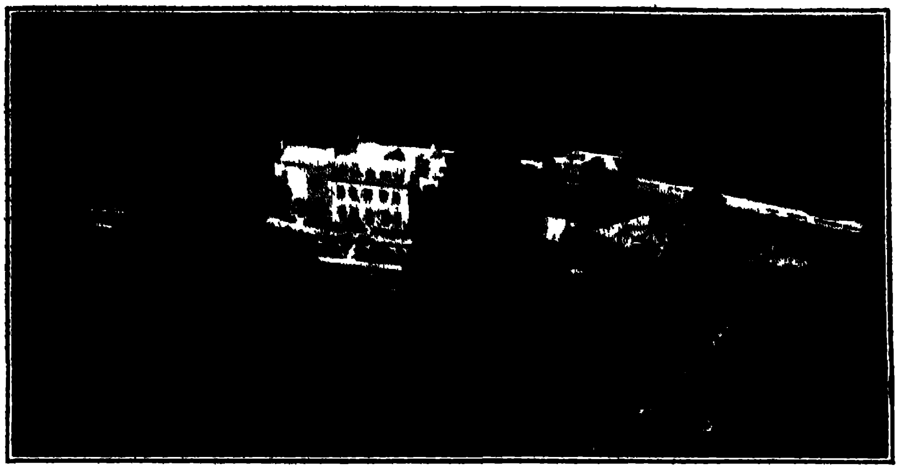

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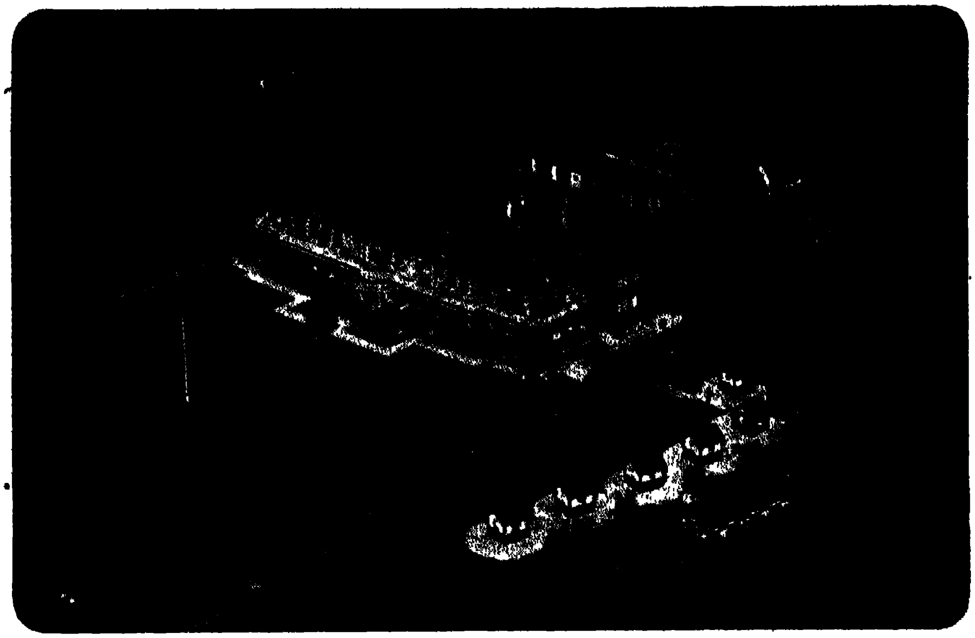

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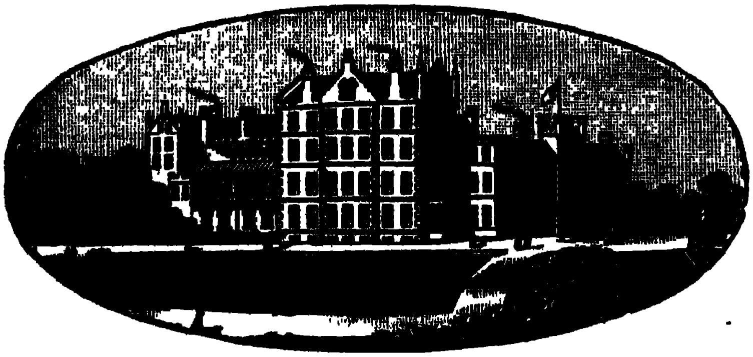

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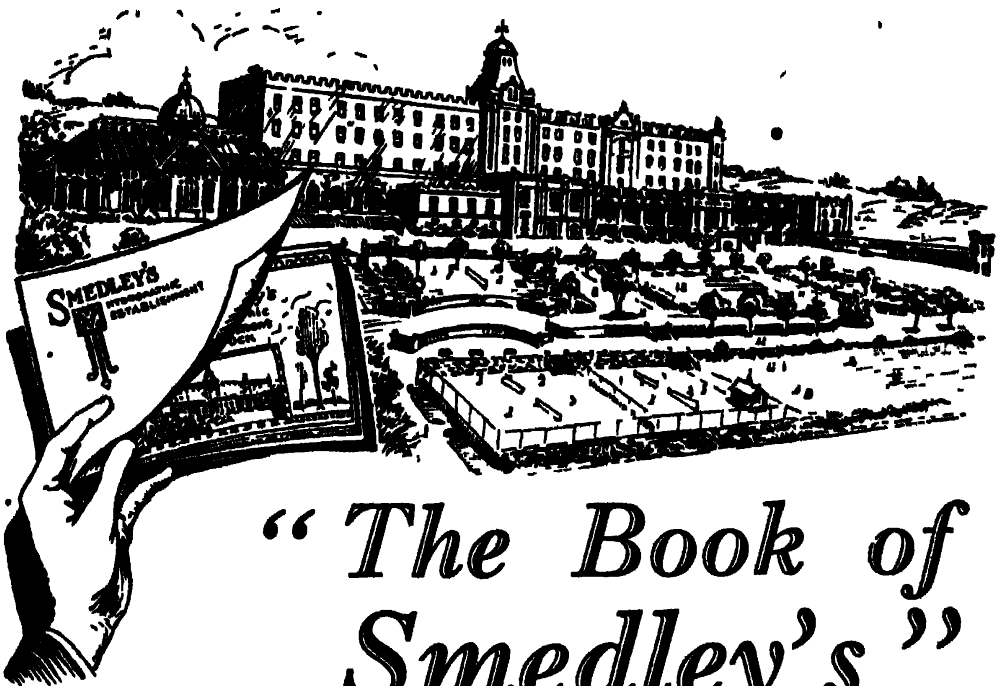

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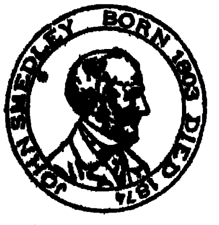

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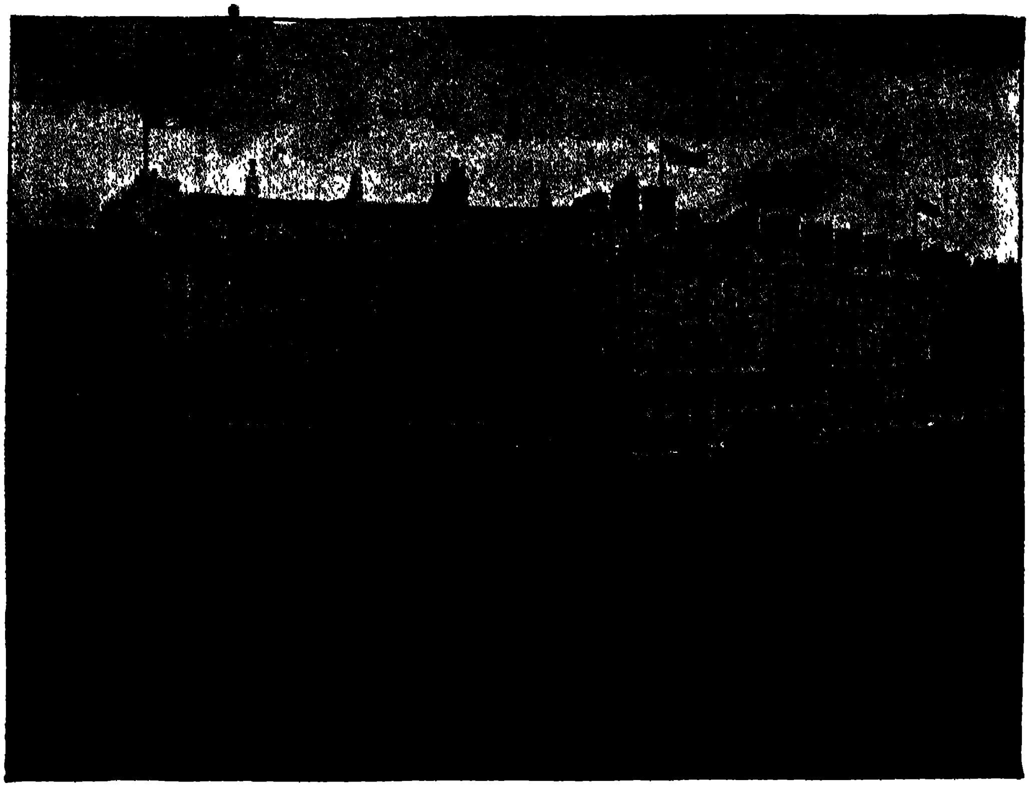

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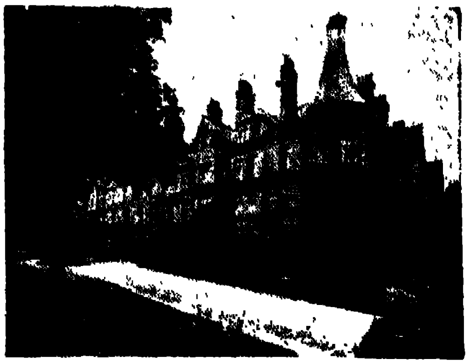

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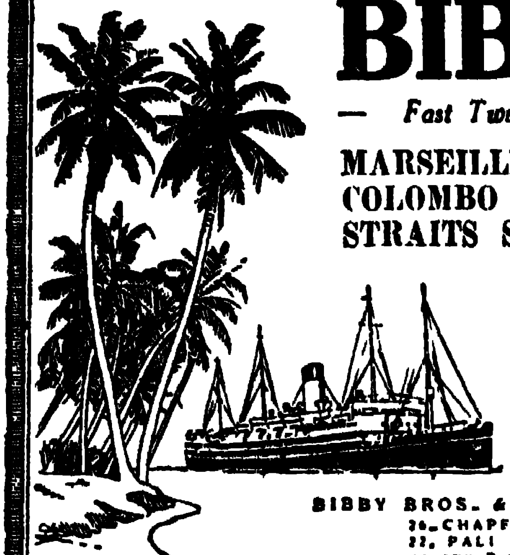

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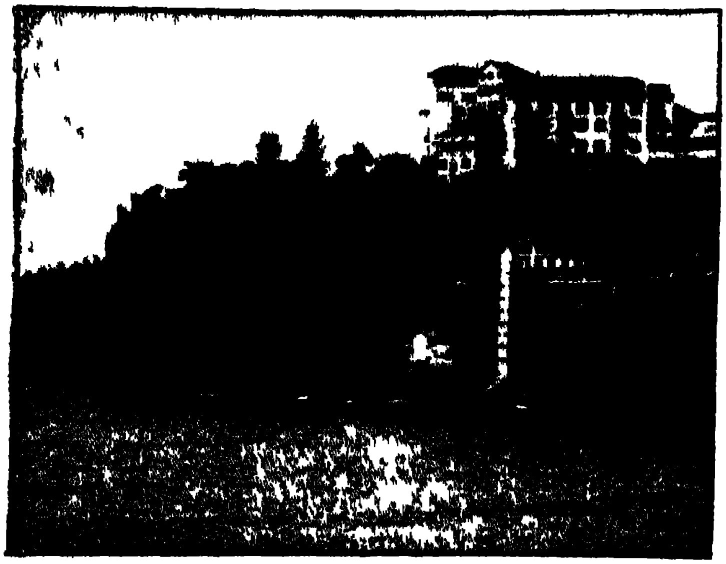

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Those who are in a state of Idiocy, or subject to Epileptic Fits, and those whose condition either threatens speedy dissolution of life or requires the permanent and exclusive attention of a nurse, are **not** eligible.

In connection with this Hospital, there is a **CONVALESCENT HOME** on the Surrey Hills at **WITLEY.**

For Forms or further particulars, apply to the Physician Superintendent,

J. G. PORTER PHILLIPS, M.D., F.R.C.P.

NORTHUMBERLAND HOUSE,

GREEN LANES, FINSBURY PARK, N.4.

Telephone: NORTH 0888. **Telegraphic Address: "SUBSIDIARY, LONDON."**

A Home for the Treatment of Patients of both sexes suffering from Mental Illnesses

Conveniently situated four miles from Charing Cross. Nearest Stations, Finsbury Park (Piccadilly and Moorgate St. Underground, and G.N. Railways). Cars and Buses pass the Gate.

Six acres of ground, highly situated, facing Finsbury Park. Private villas. Suites of rooms. Convalescent Home: KEARSNEY COURT, DOVER. Voluntary Boarders received without certificates. Terms from 4½ Guineas per week.

For further particulars apply to the Medical Superintendent.

ST. PATRICK'S HOSPITAL,

DUBLIN.

For the treatment of Nervous and Mental Diseases.

FOUNDED BY JONATHAN SWIFT, D.D., 1745.

THIS historic Institution, the first of its kind in Ireland, has been completely modernized and considerably enlarged. It affords every facility for the treatment of ladies and gentlemen suffering from nervous and mental diseases.

There are branch establishments situated at St Edmondsbury, Lucan, within a beautifully wooded demesne of about 400 acres. A portion of the demesne is worked as a home farm, from which daily supplies of milk, mutton, poultry and vegetables, etc., are delivered to the three hospitals by means of a motor van. Extensive gardens and recreation grounds. Frequent drives by motor.

MEDICAL STAFF.

Medical Superintendent -	RICHARD R. LEEPER, F.R.C.S.I.
Assistant Medical Officers -	ROBERT THOMPSON, M.B., D.P.M. ROBERT TAYLOR, L.R.C.P. and S.I. NORMAN J. MATHER, M.B., B.Ch.
Clinical Pathologist -	ROBERT H. MICKS, M.D., F.R.C.P.I.
Visiting Physician -	RICHARD A. HAYES, M.D., F.R.C.S I.
Dentist - -	ALBERT F. CARBURY, L.D.S.I.

Rates of maintenance vary according to the nature of each case and the accommodation required.

For forms and further particulars apply to Mr. A. E. Coe, Registrar, St. Patrick's Hospital, James Street, Dublin; or, in case of urgency, to the Medical Superintendent. *Telephones:* Dublin 538. Lucan 21.

ST. ANDREW'S HOSPITAL

For Mental Disorders

NORTHAMPTON

FOR THE UPPER AND MIDDLE CLASSES ONLY.

President: **The Most Hon. the MARQUESS OF EXETER, C.M.G., C.B.E.**

Medical Superintendent: DANIEL F. RAMBAUT, M.A., M.D.

THIS Registered Hospital is situated in 120 acres of park and pleasure grounds. Voluntary Boarders, persons suffering from incipient nervous and mental disorders, as well as certified patients of both sexes, are received for treatment. Careful clinical, biochemical, bacteriological, and pathological examinations. Private rooms with special nurses, male or female, in the Hospital or in one of the numerous villas in the grounds of the various branches can be provided.

WANTAGE HOUSE.

This is a Reception Hospital, in detached grounds with a separate entrance, to which patients and voluntary boarders can be admitted. It is equipped with all the apparatus for the most modern treatment of Mental and Nervous Disorders. It contains special departments for hydrotherapy by various methods, including Turkish and Russian baths, the prolonged immersion bath, Vichy Douche, Scotch Douche, Electrical baths, Plombières treatment, etc. There is an Operating Theatre, a Dental Surgery, an X-ray Room, an Ultra-violet Apparatus, and a Department for Diathermy and High Frequency treatment. It also contains Laboratories for biochemical, bacteriological, and pathological research.

MOULTON PARK.

Two miles from the Main Hospital there are several branch establishments and villas situated in a park and farm of 650 acres. Milk, meat, fruit, and vegetables are supplied to the Hospital from the farm, gardens and orchards of Moulton Park. Occupation therapy is a feature of this branch, and patients are given every facility for occupying themselves in farming, gardening, and fruit growing.

BRYN-Y-NEUADD HALL.

The Seaside House of St. Andrew's Hospital is beautifully situated in a Park of 330 acres, at Llanfairfechan, amidst the finest scenery in North Wales. On the North-West side of the Estate a mile of sea coast forms the boundary. Voluntary Boarders or Patients may visit this branch for a short seaside change or for longer periods. The Hospital has its own private bathing house on the seashore. There is trout-fishing in the park.

At all the branches of the Hospital there are cricket grounds, football and hockey grounds, lawn tennis courts (grass and hard court), croquet grounds, golf courses, and bowling greens. Ladies and gentlemen have their own gardens, and facilities are provided for handicrafts such as carpentry, etc.

For terms and further particulars apply to the Medical Superintendent (*Telephone No. 56 Northampton*) who can be seen in London by appointment.

New Saughton Hall, POLTON, MIDLOTHIAN.

The only Private Hospital for the Treatment of Mental Cases in Scotland.

NEW SAUGHTON HALL, which takes the place of Saughton Hall, established in 1798, is situated seven miles south of Edinburgh, in the beautiful neighbourhood of Hawthornden and Rosslyn, and is surrounded by picturesque and well-timbered pleasure grounds extending to 125 acres. There is a frequent motor bus service from Edinburgh to Loanhead.

RAILWAY STATIONS.—Polton five minutes; and Loanhead, ten minutes' walk from the Institution—reached in half-an hour from the Waverley Station, Edinburgh. *Telephone: 4 Loanhead.*

Forms of Admission for Voluntary or Certified Cases, full instructions, etc., can be obtained on application to the Resident Medical Supt., **JAMES H. SKEEN, M.B.**

Terms from £157 to £525 per annum, according to requirements.

THE COPPICE, NOTTINGHAM.

Hospital for Mental Diseases.

THIS Institution for the reception of **PRIVATE PATIENTS** of both sexes of the **Upper and Middle Classes** only, at moderate rates of payment, is beautifully situated in its own grounds about two miles from Nottingham, and from its singularly healthy and pleasant position, and the comfort of its internal arrangements, affords every facility for the **Relief and Cure of those Mentally Afflicted.** Divine Service is held in the Institution every Sunday by the Chaplain, who also visits the Patients. Carriage and motor exercise is provided.

Voluntary Boarders admitted without Certificates.

FOR TERMS, ETC., APPLY TO

DR. HUNTER, ***Physician-Superintendent.***

HOLLOWAY SANATORIUM

VIRGINIA WATER.

A Registered Hospital for the CURE and CARE of the INSANE and of NERVOUS INVALIDS — of the MIDDLE and UPPER CLASSES.—

THIS Institution is situated in a beautiful and healthy locality, within easy reach of London. It is fitted with every comfort. Patients can have Private Rooms and Special Attendants, as well as the use of General Sitting Rooms, at moderate rates of payment. Voluntary Boarders not under Certificates can be admitted.

There is a BRANCH ESTABLISHMENT at CANFORD CLIFFS, BOURNEMOUTH, where Patients and Boarders can be sent for a change and provided with all the comforts of a well-appointed home.

For Terms, apply to the RESIDENT MEDICAL SUPERINTENDENT,
St. Ann's Heath, Virginia Water, SURREY.

BOREATTON PARK

THIS PRIVATE ASYLUM, which was founded by the late W. H. O. SANKEY, M.D., F.R.C.P., for the reception of a limited number of

LADIES & GENTLEMEN MENTALLY AFFLICTED,

—— is now conducted by his son, ——
E. H. O. SANKEY, M.A., M.B., B.C.Cantab.

The Ladies' Division is directly supervised by MISS SANKEY.

The Mansion stands high, among handsomely laid-out gardens in the midst of a picturesque deer park (about 40 head of deer are kept), and commands a magnificent view of Welsh Mountain scenery.

Carriages, horses, motor, lawn-tennis, golf, and fishing are provided.

Arrangements can be made to enable friends of patients to reside in the House as Boarders if so desired.

The Asylum is situate about ten miles from Shrewsbury, within easy distance of Baschurch Station, G.W.R., whither carriages can be sent at any time for visitors.

Letters and Telegrams should be addressed to—

Dr. SANKEY, Boreatton Park, Baschurch, SALOP.

THE WARNEFORD

HEADINGTON HILL, OXFORD.

A Registered Hospital for the Care & Treatment of both Sexes of the Upper and Middle Classes, when suffering from Nervous and Mental Disorders. . .

President—THE RIGHT HON. THE LORD SAYE AND SELE.

Chairman of the Committee—

J. BARON MOYLE, Esq, D C.L, Fellow of New College.

Vice-Chairman—

F. A. DIXEY, Esq, F.R.S., D.M., Fellow & Sub-Warden of Wadham College.

THIS HOSPITAL is pleasantly situated on Headington Hill, on the outskirts of the City of Oxford. The grounds, which extend to over 120 acres, command extensive views of the surrounding country

The buildings are arranged, so far as is compatible with the requirements of a Mental Hospital, in the manner of an ordinary private residence.

VOLUNTARY BOARDERS ARE RECEIVED.

For Terms and further particulars, apply to the - **Physician Superintendent, ALEX. W. NEILL, M.D.**

Telephone— 2063 OXFORD.

CHEADLE ROYAL,

CHEADLE, CHESHIRE.

A Registered Hospital for MENTAL DISEASES, and its Seaside Branch, GLAN-Y-DON, Colwyn Bay, N. Wales.

THE object of this Hospital is to provide the most efficient means for the treatment and care of those of the Upper and Middle Classes suffering from MENTAL & NERVOUS DISEASES. The Hospital is governed by a Committee appointed by the Trustees of the Manchester Royal Infirmary. VOLUNTARY BOARDERS are also received for treatment.

For Terms and further information apply to the MEDICAL SUPERINTENDENT.

Telephone - Gatley 163.

Littleton Hall, Brentwood

ESSEX

A limited number of Ladies received, with or without certificate. Large grounds. 18 miles from London. 1 mile from station. Full particulars from DR. HAYNES. *Telephone:* Brentwood 45

HAYDOCK LODGE

NEWTON-LE-WILLOWS, LANCASHIRE

Telegraphic Address: "STREET, ASHTON-IN-MAKERFIELD" *(two words only).*
Telephone: ASHTON-IN-MAKERFIELD 11

A PRIVATE MENTAL HOSPITAL FOR THE TREATMENT OF NERVOUS AND MENTAL DISORDERS EITHER VOLUNTARILY OR UNDER CERTIFICATE

HAYDOCK LODGE is a large Country Mansion especially adapted for the Care and Treatment of Persons with Nervous and Mental Disorders, having been enlarged and rebuilt on plans sanctioned and approved by the Commissioners in Lunacy. It is charmingly situated in a healthy and retired neighbourhood, standing in its own well-timbered Park, Gardens, and Farm of 300 acres, with provision and facilities for Tennis, Cricket, Football, Bowls, Croquet and Golf.

Newton-le-Willows is a first-class station on the L. M. & S. Rly. (midway between Liverpool and Manchester), where conveyances are always to be had.

Motors are kept for the use of Patients, and those whose condition will allow and whose friends desire it, spend some time annually at the seaside. Voluntary Boarders are received without Certificate, written application for admittance being all that is required.

Haydock Lodge has also associated with it an establishment at **GRETA BANK** (for ladies only), in the Craven district of Yorkshire, near Ingleton.

TERMS, PROSPECTUS and INFORMATION may be obtained on application to the Medical Superintendent.

Consultations can be arranged by appointment.

Resident Medical Licensee	J. C. WOOTTON, L.R.C.P.Lond., M.R.C.S.Eng.
Medical Superintendent	T. J. MCCARTHY, L.R.C.P., L.R.C.S.
Medical Officer	F. M. SEAL, M.B., M.R.C.S., L.R.C.P.

The Lawn, Lincoln

A Registered Hospital founded in 1819 for the care and treatment of Private Patients and Voluntary Boarders suffering from mental and nervous disorders.

The Hospital combines the advantages of town and country, a maximum of fresh air and sunshine being afforded by its situation in large gardens on the southern slope of the hill near the Cathedral, while the centre of the town is within easy access. Open-air treatment is provided on a glass-roofed verandah permeable to ultra-violet rays, and special facilities for psychotherapy are offered to suitable and co-operative patients.

For terms and particulars apply to the Medical Superintendent, who can be seen by appointment in London.

CITY MENTAL HOSPITAL

PORTSMOUTH

Accommodation is provided for Ladies and Gentlemen in Two Detached Villas, at a charge from **2½ guineas** upwards, including all necessaries except clothing.

APPLY - MEDICAL SUPERINTENDENT.

KINGSDOWN HOUSE

BOX (Near BATH).

Telephone: No. 2 Box

FOR THE TREATMENT OF DISEASES OF THE BRAIN AND NERVOUS SYSTEM

THIS House is situate 450 feet above sea level, and commands extensive views of the surrounding country.

Special accommodation for Patients of the Voluntary Class, which is encouraged.

ACCESS—Box Station (G.W.R.); Bath Stations (Midland and G.W.R.) twenty minutes from the house.

For terms, etc., apply to —

Dr. H. C. MacBRYAN or MEDICAL SUPERINTENDENT

at the above,

Or at 17 BELMONT, BATH - - *Telephone:* No. 636 Bath

ST. PATRICK'S

Belmont Park, WATERFORD

Private Mental Hospital for Gentlemen.

CONDUCTED BY THE BROTHERS OF CHARITY

THIS beautiful residence is admirably adapted to its present purpose. It is erected on an eminence overlooking the City and Harbour of Waterford, and is surrounded with scenery of the most varied character. The views from the House and grounds extend over miles of picturesque country. From its singularly healthy and pleasant position and the comforts of its internal arrangements, it affords every facility for the relief and cure of those mentally afflicted.

The pleasure grounds, which are very spacious, have been laid out in the most tasteful manner for the recreation of the patients. They have also the privilege of long country walks, car drives, motoring, and seaside excursions

For Terms apply to **THE REV. SUPERIOR**

BOOTHAM PARK, YORK

A REGISTERED MENTAL HOSPITAL
for the Treatment and Cure of Nervous and
Mental Invalids of the Upper & Middle Classes

For Particulars apply to the Medical Superintendent :—

GEORGE RUTHERFORD JEFFREY, M.D. Glasg., F.R.C.P.E., F.R.S.E.

BETHEL HOSPITAL

FOR MENTAL DISEASES,

NORWICH.

ESTABLISHED A.D. 1713.

THIS Institution is a Registered Hospital, managed by a Board of Governors who have no pecuniary interest in its success, but whose sole object is to promote the comfort and well-being of the Patients. The Hospital is arranged for both sexes.

Voluntary Boarders are admitted without certificates.

CONSULTING PHYSICIAN:
SAMUEL J. BARTON, M.D.

RESIDENT MEDICAL SUPERINTENDENT:
SAVILLE J. FIELDING, M.B.

CLERK TO THE GOVERNORS:
B. F. HORNOR, QUEEN STREET, NORWICH.

MATRON:
MISS OXLEY.

APPLICATION FOR ADMISSION TO BE MADE TO THE

Resident Medical Superintendent, BETHEL HOSPITAL, NORWICH.

PRIVATE MENTAL HOSPITALS

CO. DUBLIN.

HAMPSTEAD, Glasnevin, for Gentlemen.—HIGHFIELD, Drumcondra, for Ladies

For the Cure and Care of Patients of the Upper Class suffering from Mental and Nervous Diseases and Abuse of Drugs.

Telephone: Drumcondra No. 3. Telegrams: "Eustace," Glasnevin.

These Hospitals are built on the Villa System, and there are also Cottages on the demesne (154 acres), which is 150 ft. above the sea level and commands an extensive view of the Dublin Mountains and Bay.

Voluntary Patients admitted without Medical Certificates.

For further information apply for illustrated prospectus, etc., to the Resident Medical Superintendent: Dr. WILLIAM NIELSON EUSTACE, Hampstead, Glasnevin; or at the Office, 41, Grafton Street, Dublin. *Telephone:* Dublin No. 1224. On Mondays, Wednesdays, and Fridays, at 2.30 p.m.

House of St. John of God

STILLORGAN CASTLE, BLACKROCK,

Co. DUBLIN.

PRIVATE MENTAL HOSPITAL FOR GENTLEMEN.

This Hospital lies about five miles south of Dublin, on 34 acres of land, with a magnificent view, on Dublin Bay. It is recognized by the General Nursing Council of Ireland as a Training School for Mental Nurses.

"The condition of the Institution was highly satisfactory" (*Bi-annual Report of Dr. Kelly, Inspector of Mental Hospitals, July 4, 1927*).

Director: REV. E. HUMBERT,
Chaplain: REV. FLAVIAN LEONARD
Resident Doctor: J. J. BOLAND, M.B., B.Ch., B.A.O.

DERBY MENTAL HOSPITAL

ALBANY HOUSE, a Detached Block for FEMALE PRIVATE PATIENTS.

TERMS: **2 GUINEAS PER WEEK** and upwards. This includes everything except clothing. This Villa is distinct from the main building, and has separate recreation grounds.

For further particulars, apply to the Medical Superintendent,
DR. JOHN BAIN, Rowditch, DERBY.

THE GRANGE, Near Rotherham.

A SANATORIUM OF THE HIGHEST CLASS FOR THE

CARE & CURE OF MENTAL INVALIDS (Ladies).

Resident Physician: G. E. MOULD, M.R.C.S. Eng., L.R.C.P. Lond.,
Physician for Mental Diseases to the Sheffield Royal Hospital.

THE House is a spacious Family Mansion, with extensive pleasure grounds, including good Croquet and Tennis Grounds, and an immense Park, containing Private Drives and Walks of several miles in extent. It is situated in the heart of the famous Robin Hood Country (5 miles from Sheffield, 4 from Rotherham) and is surrounded by beautiful scenery, and an atmosphere free from smoke and impurity. Situation dry and healthy. The arrangements are of a domestic character. The Proprietors welcome visits from the usual Medical Attendant of the Patient during her residence. Under the New Act Voluntary Patients can be received, without Certificates, on own personal application. The Rev. R. T. C. Slade, Mus. Bac., late Vicar of Thorpe-Hesley, acts as Chaplain, and conducts regular Services.

The Resident Physician may be seen at the Grange; or at 342 Glossop Road, Sheffield, by appointment. Telephone: Sheffield 40030

GRANGE LANE STATION (L. & N.E. Railway) is within a quarter of a mile of the Grange, and may be reached via Sheffield or Barnsley direct; or via Rotherham changing at Tinsley.

FOR TERMS, FORMS, &C., APPLY TO THE RESIDENT PHYSICIAN.

Shaftesbury House,

FORMBY-BY-THE-SEA.

Telephone: No. 8 FORMBY. *Near LIVERPOOL.*

THIS HOUSE, specially built and licensed for the **Care and Treatment of a limited number of LADIES and GENTLEMEN suffering from**

MENTAL or NERVOUS BREAKDOWN,

is delightfully situated between Liverpool and Southport in well-wooded grounds. Outdoor and indoor amusements and occupation provided. Voluntary Boarders received. Psycho-Therapy in suitable cases if desired.

TERMS MODERATE. *Apply RESIDENT PHYSICIAN.*

BAILBROOK HOUSE, BATH.

For the Care and Treatment of Ladies & Gentlemen suffering from - Nervous or Mental Breakdown. -

Special Attention is given to the Curative Treatment of Early Cases.

Apply - *RESIDENT PHYSICIAN.*
Telephone : BATHEASTON 8189.

VOLUNTARY PATIENTS RECEIVED.

Trams to Bathford pass the entrance gates of Bailbrook House.

Inclusive Terms from 5 Guineas per week.

PLYMPTON HOUSE

PLYMPTON, DEVON

ESTABLISHED 1834

PLYMPTON HOUSE is licensed for the accommodation of both sexes, and is well adapted by its position and appointments for the **Medical Treatment and Care of Patients of the Upper and Middle Classes, suffering from MENTAL DISEASE.**

TERMS ON APPLICATION. *Letters and Telegrams :*
Telephone: No. 2 PLYMPTON. DR. J. C. NIXON, PLYMPTON.

THE MOAT HOUSE,

TAMWORTH, STAFFS.

Established 1816. For the TREATMENT of a few LADIES suffering from **NERVOUS** and **MENTAL DISORDERS.** Voluntary Patients received.

For Terms apply to Proprietor and Licensee : DR. LOWSON.
Telephone - 108 Tamworth.

ALCOHOLISM **Other DRUG HABITS, INSOMNIA, NEURASTHENIA, TROPICAL DISORDERS, VARICOSE VEINS, etc.**

“ Oaklands ”

15, THE AVENUE, BECKENHAM, KENT

Terms moderate. Quiet and pleasant situation. Ladies and Gentlemen admitted for treatment. *Telephone :* Ravensbourne 3622. *Telegrams :* “ Hare, Beckenham.”

As founded and established by the late FRANCIS HARE, M.D., M.R.C.S., for 20 years Medical Superintendent of the Norwood Sanatorium, and author of “ Alcoholism,” etc.

Medical Superintendent : **WALTER E. MASTERS, M.D., M.R.C.S., D.P.H. (Author of “ Essentials of Tropical Medicine,” etc.)**

ASHWOOD HOUSE,

KINGSWINFORD, STAFFORDSHIRE.

An old-established and modernized Institution for the Medical Treatmen of Ladies and Gentlemen Mentally Afflicted.

THE House, pleasantly situated, stands in picturesque grounds of fort acres in extent, with a surrounding country noted for the beauty of it walks and drives. The climate is genial and bracing. Occupation, indoo and outdoor amusements, and carriage and other exercise amply provided

TERMS vary according to requirements as to accommodation special attendance, etc.

TELEPHONE 19, KINGSWINFORD.

Railway Stations: Stourbridge Junction (G.W.R.), 3½ miles; Dudley (L.M. & S.R.), 4 miles Wolverhampton (G.W.R. or L.M. & S.R.), 7 miles.

FOR FURTHER PARTICULARS APPLY TO THE MEDICAL SUPERINTENDENT.

FARNHAM HOUSE & MARYVILLE

FINGLAS, Co. DUBLIN.

Private hospitals for Mental and Nervous Illness, including the Allied Disorders of Alcoholism and the Drug Habit.

Ideally situated within two miles of the City and in a health-inducing district.

Voluntary boarders received without medical certificates.

Experienced staff; modern treatment. Interviews can be arranged at a convenient town address. Apply:

H. R. C. RUTHERFORD, F.R.C.S.I., D.P.H.,
'PHONE: FINGLAS 11. *Medical Superintendent*

Bucks Mental Hospital

THE COMMITTEE OF VISITORS are prepared to receive

PRIVATE PATIENTS on Moderate Terms

Separate accommodation is provided for Private Patients on the Male and Female sides of the Institution. The Hospital is situated in the Country, three miles from Aylesbury Station, and about forty miles from London.

For further particulars apply to the MEDICAL SUPERINTENDENT—

DR. H. KERR, STONE, AYLESBURY.

BARNWOOD HOUSE
GLOUCESTER

A REGISTERED HOSPITAL for the CARE and TREATMENT of LADIES and GENTLEMEN suffering from NERVOUS and MENTAL DISORDERS.

WITHIN two miles of the G.W.R. and L.M. & S. Railway Stations at Gloucester, the Hospital is easily accessible by Rail from London and all parts of the United Kingdom. It is beautifully situated at the foot of the Cotswold Hills, and stands in its own grounds of over 280 acres. Voluntary Boarders of both sexes are also received for Treatment.

Special accommodation for LADY VOLUNTARY BOARDERS is also provided at the MANOR HOUSE, which has its own private grounds and is entirely separate from the main Hospital.

For particulars as to Terms, etc., apply to **ARTHUR TOWNSEND, M.D.,**
Telephone: No. 7 BARNWOOD. *Resident Superintendent.*

THE FLOWER HOUSE BECKENHAM LANE, S.E.6

Telephone: LEE GREEN 1998

8 miles from London.

A PRIVATE HOME of the highest class for *Gentlemen* suffering from Mental and Nervous Disorders, both under certificates or as *Voluntary Boarders.*

A beautifully furnished old Family Mansion thoroughly modernised and up to date.

Twenty five acres of well-timbered grounds, containing unrivalled flower gardens, cricket and football fields, croquet, tennis and bowls.

Billiards room, Private Theatre, and Wireless.

Special suites for suitable patients, in new annex, consisting of private sitting room, bed room, attendant's room (if necessary) and private bath room and lavatory.

Station, BECKENHAM HILL, 3 minutes, and Beckenham Junct.

Tram 54 from Victoria to Southend Village, which is 2 minutes' walk from Flower House.

Motor Buses 54 47, 586.

For terms and further particulars apply
W. F. UMNEY, M.D., Medical Superintendent, or
Mrs. à BECKETT. Resident Licensee.

THE
MENTAL HOSPITAL
DIGBYS, near EXETER.

The above Hospital, situated in healthy country, three miles from Exeter, RECEIVES PRIVATE PATIENTS OF BOTH SEXES.

FEES: TWO GUINEAS per week.

Particulars on application to the
MEDICAL SUPERINTENDENT.

Newlands House

TOOTING BEC COMMON,
LONDON, S.W.17.

Private Mental Hospital

FOR LADIES & GENTLEMEN.

Telephone:
STREATHAM 0524.

SPRINGFIELD HOUSE,

Near BEDFORD.

Telephone No. 3417.

For Mental Cases, with or without Certificates.

Ordinary Terms, Five Guineas per week (including Separate Bedrooms for all suitable Cases, without extra charge). :: ::

For forms of admission, &c., apply to the DRS. BOWER, as above, or at 5, DUCHESS STREET, PORTLAND PLACE, W.1, on Tuesdays, from 4 p.m. to 5 p.m.

The Old Manor, Salisbury

Telephone 51.

A PRIVATE HOSPITAL FOR THE CARE AND TREATMENT OF THOSE OF BOTH SEXES SUFFERING FROM MENTAL DISORDERS.

Extensive grounds. Detached Villas. Chapel. Garden and dairy produce from own farm. Terms very moderate.

Convalescent Home at Bournemouth

standing in 9 acres of Ornamental Grounds, with Tennis Courts, etc. Patients or Boarders may visit the above, by arrangement, for long or short periods.

Illustrated Brochure on application to the Med. Supt., The Old Manor, Ltd., Salisbury.

CLARENCE LODGE,

CLARENCE ROAD, CLAPHAM PARK, S.W.4.

A LIMITED number of **LADIES** suffering from **MENTAL** and **NERVOUS DISORDERS** are received for treatment under a Specialist. The House stands in large grounds.

For further Particulars see Illustrated Prospectus from the Proprietress,
Telephone: Brixton 0494. Mrs. THWAITES.

EAST SUSSEX COUNTY MENTAL HOSPITAL.

Accommodation is provided for Private Patients resident in the County. The Estate comprises 400 acres, and is situated on high ground nine miles north of Eastbourne, and four miles west of Pevensey Bay. There is a separate detached block for children. For particulars apply to

The Resident Physician and Medical Supt., The Hospital, HELLINGLY.

CAMBERWELL HOUSE,

33, PECKHAM ROAD, LONDON, S.E. 5.

Telegrams: "PSYCHOLIA, LONDON." Telephone: RODNEY 4781-2.

For the Treatment of **MENTAL DISORDERS.**

COMPLETELY detached Villas for mild cases, with private suites if desired. Voluntary Patients received. Twenty acres of grounds. Hard and Grass Tennis Courts; Croquet, Squash Racquets, and all indoor Amusements, including Wireless and other Concerts, occupational therapy. Daily Services in Chapel.

Senior Physician: DR. HUBERT J. NORMAN,
assisted by three Medical Officers, also resident.

An Illustrated Prospectus, giving full particulars and terms, may be obtained upon application to the Secretary.

HOVE VILLA, BRIGHTON—A Convalescent Branch of the above.

Telephone: HOUNSLOW 0158.

WYKE HOUSE

ISLEWORTH, MIDDLESEX.

A PRIVATE MENTAL HOSPITAL FOR LADIES AND GENTLEMEN.

Conveniently situated in quiet rural surroundings in Syon Lane, about a quarter of a mile to the north of the new Great West Road.

Stations: OSTERLEY (District Railway); ISLEWORTH (Southern Railway).

For Terms and Further Particulars apply to the Resident Physician:—
G. W. SMITH, O.B.E., M.B., Ch.B. (Edin.)
Consulting Rooms: 57 GROSVENOR STREET, W.1. (*By Appointment*).

PECKHAM HOUSE,

112, Peckham Road, LONDON, S.E.15.

Telegrams: "ALLEVIATED, LONDON." Telephone: Rodney 4741, 4742.

THE above House, which was established in 1826, is an **INSTITUTION FOR THE CARE AND TREATMENT OF PERSONS SUFFERING FROM MENTAL DISEASES AND NERVOUS DISORDERS.** Both certified patients and Voluntary Boarders are received. Separate houses for the treatment of special and suitable cases adjoin the Institution. There is a Seaside Branch to which holiday parties are sent during the summer months, and which is available for the treatment of convalescent patients at any time. Motor and carriage exercise is provided as required. Patients can avail themselves of a course of physical drill. Tennis courts. Entertainments, dances, and indoor amusements held throughout the year.

Illustrated Prospectus and further particulars can be obtained from the MEDICAL SUPT.

HENDON GROVE,

Tel.: **Hendon 1061.**

HENDON, N.W.4.

A PRIVATE and secluded HOME for 14 LADIES suffering from any form of MENTAL DISORDER.
Voluntary Boarders or certified.

EVERY PATIENT has a private room, and a large and efficient staff is maintained. All cream, butter, eggs, milk, poultry, and fruit are produced from the estate of 15 acres. The MEDICAL OFFICER, who has had over 19 years' experience with Mental Cases, is resident with his wife and children. A Consulting Physician sees every Patient at regular intervals, and facilities are given for the visits of Patient's own Medical attendants or Consultants if desired.

FEES are inclusive, and from **£8 8s.** *per week.* DR. H. R. S. WALFORD.

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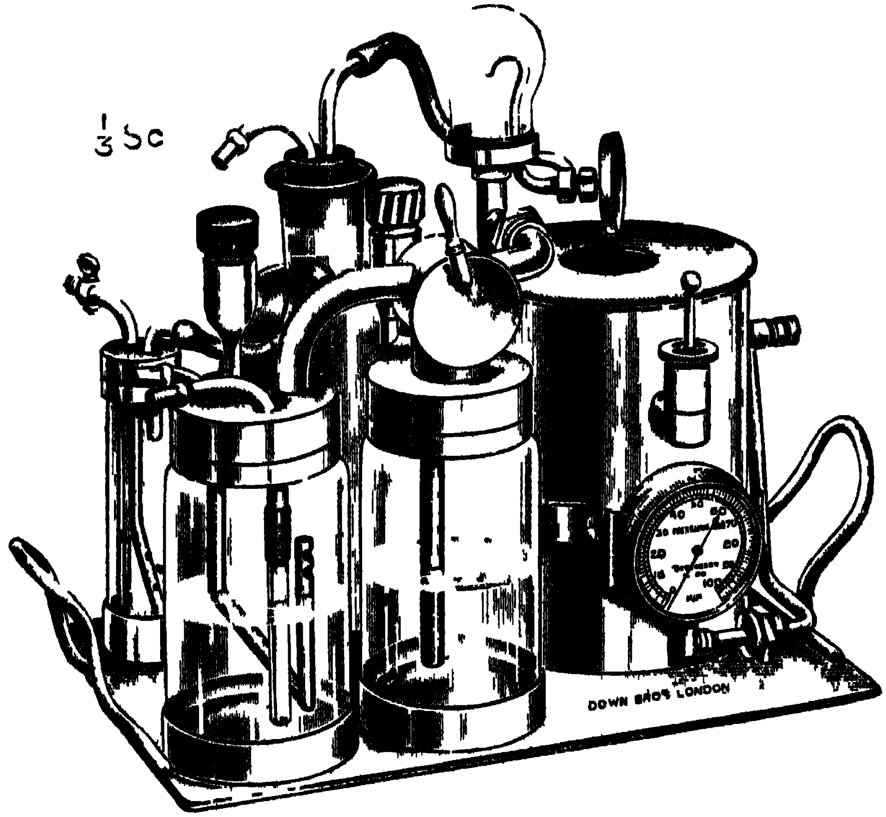

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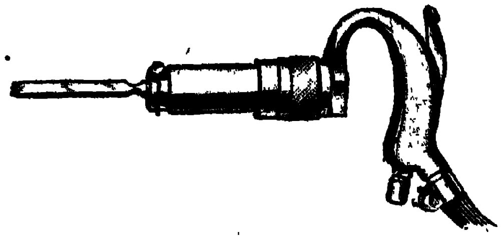

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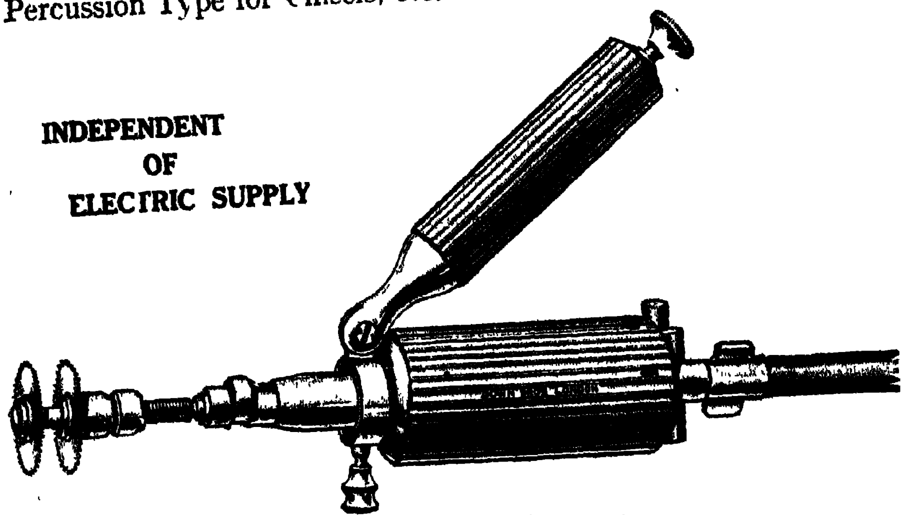

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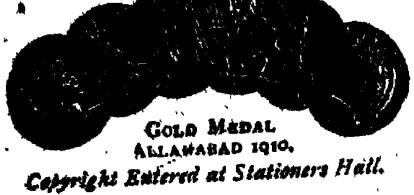

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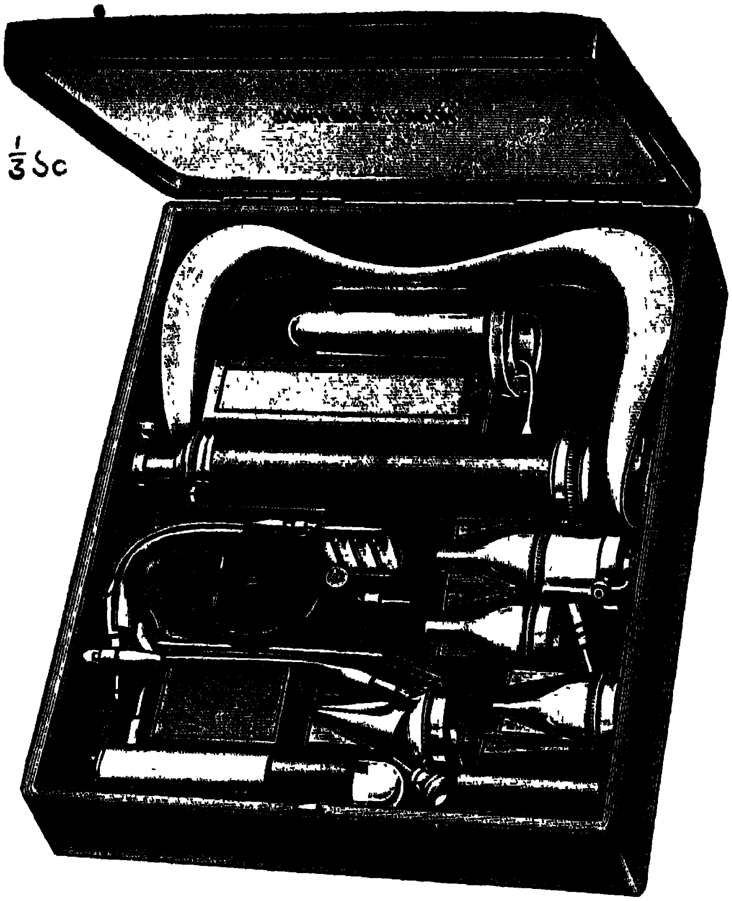

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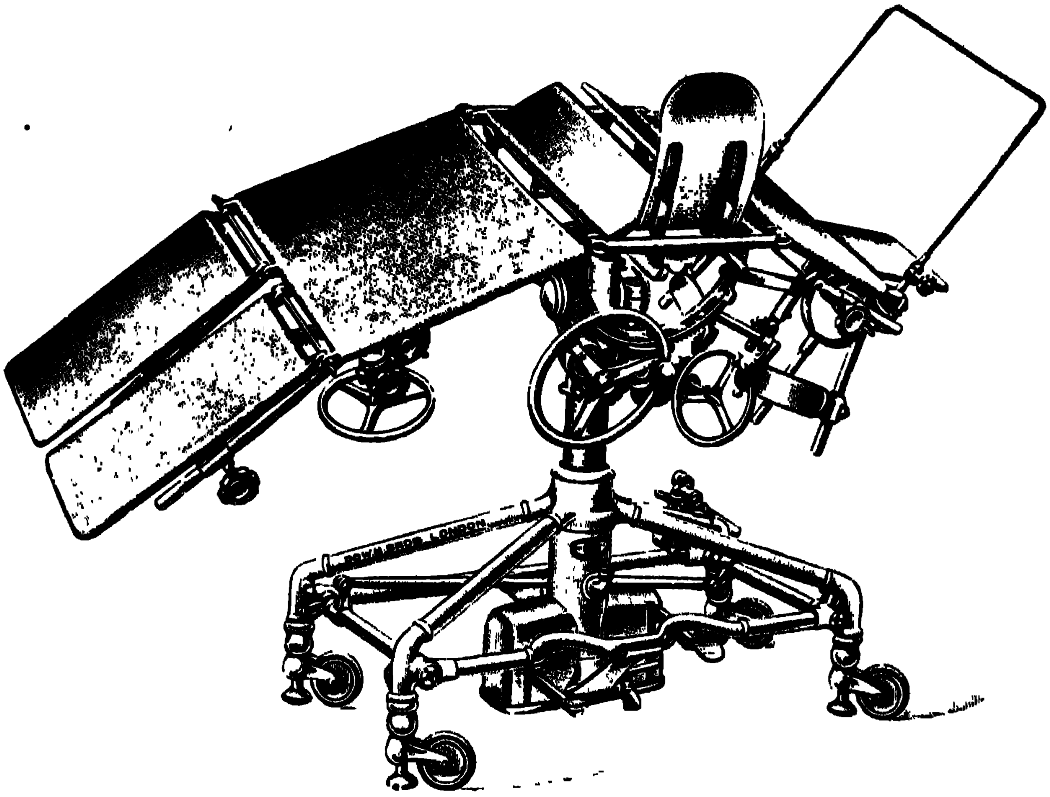

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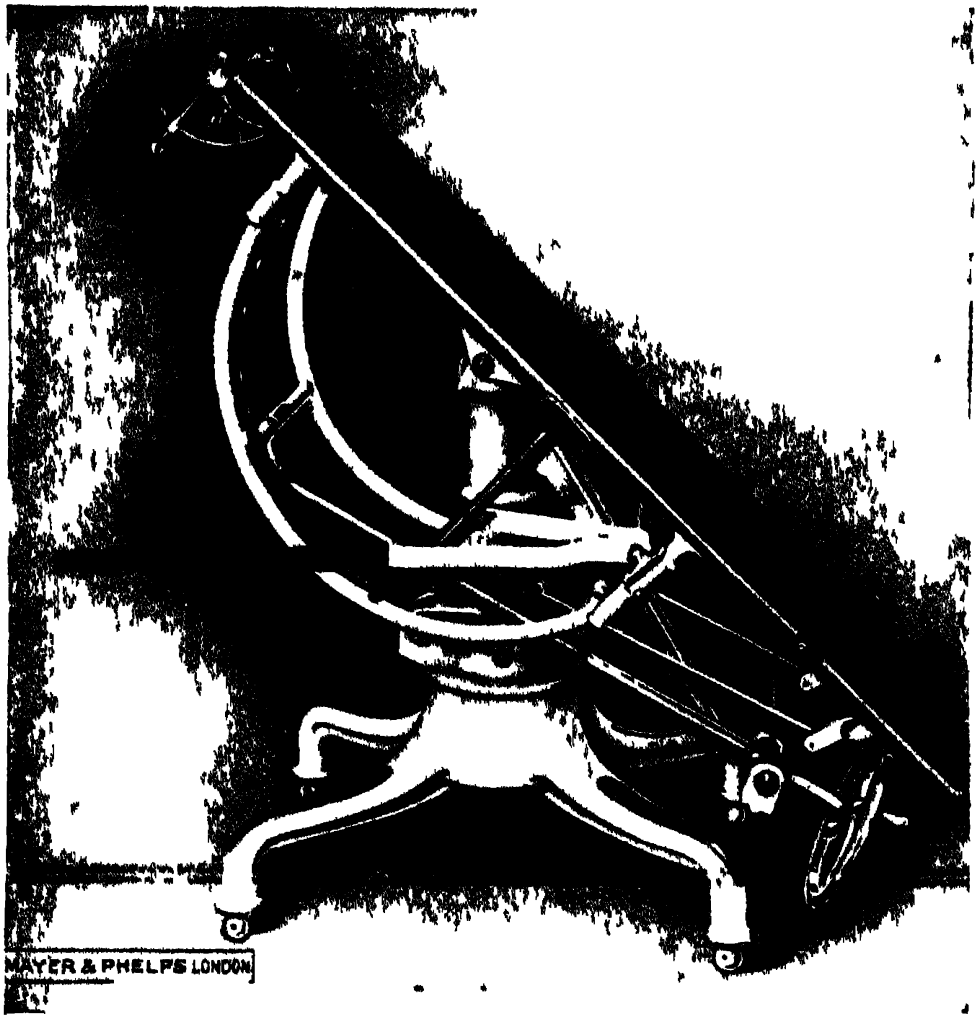

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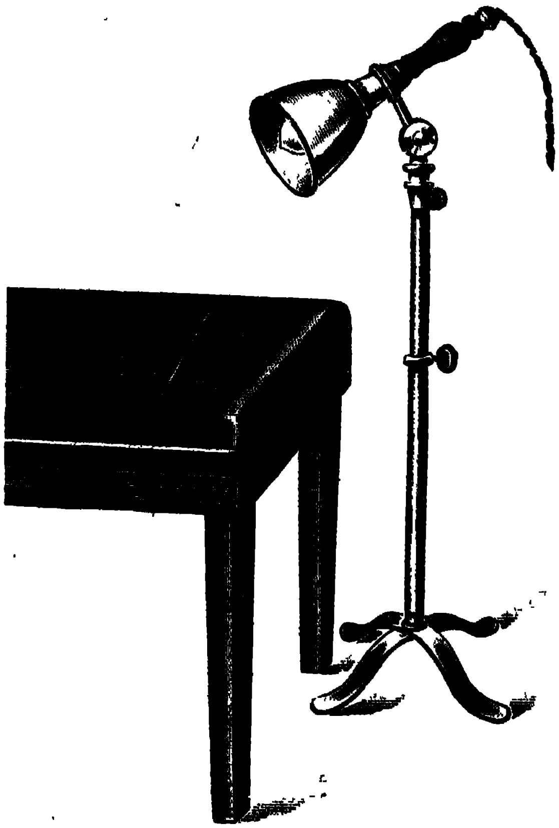

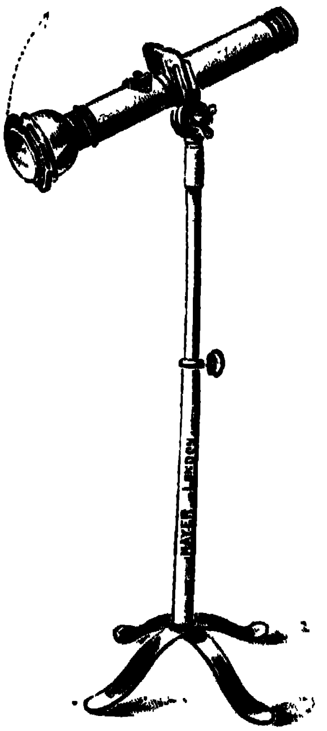

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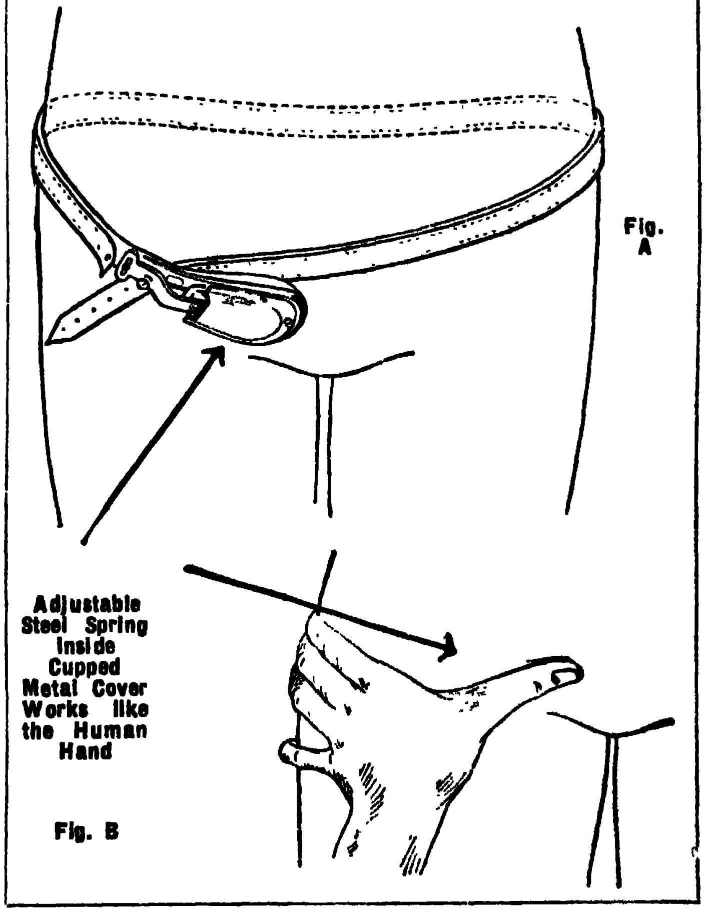
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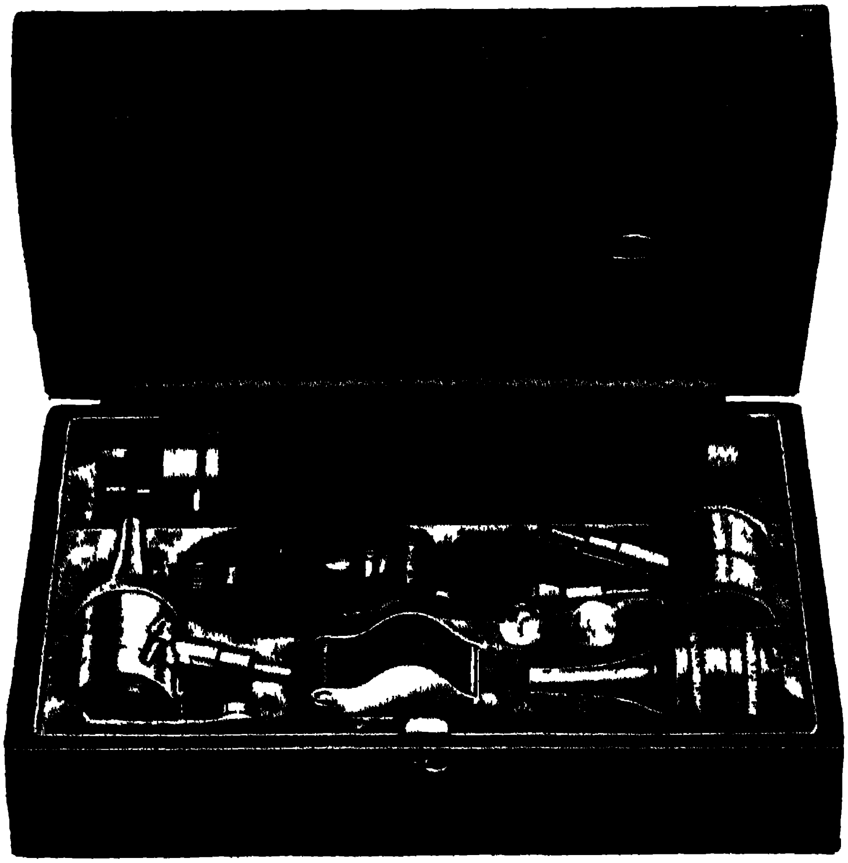

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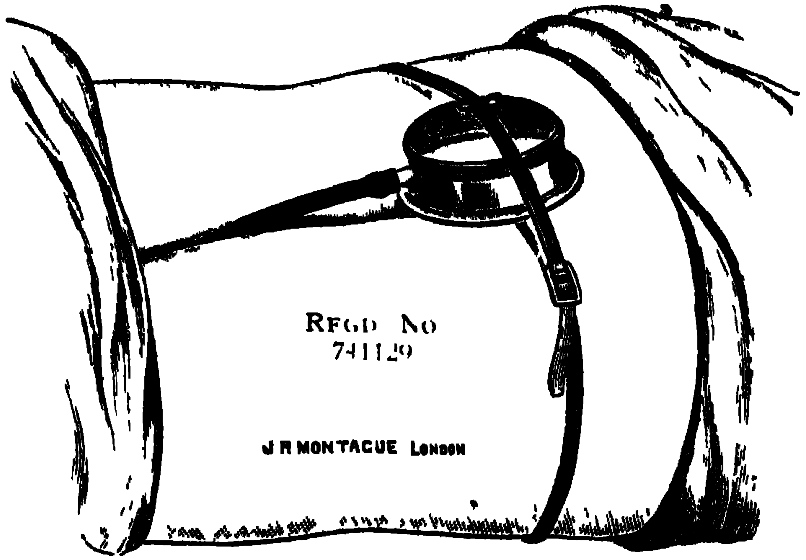

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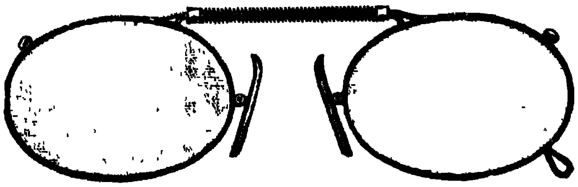

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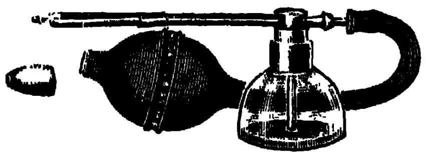

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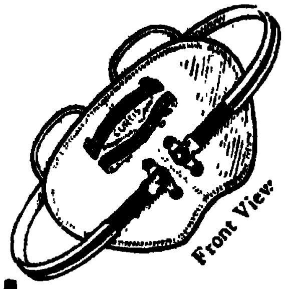

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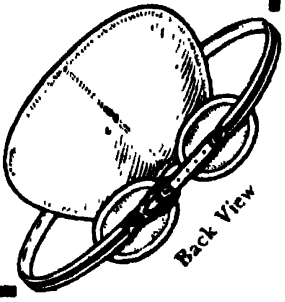

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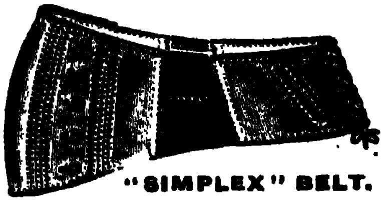

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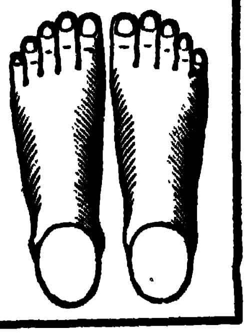

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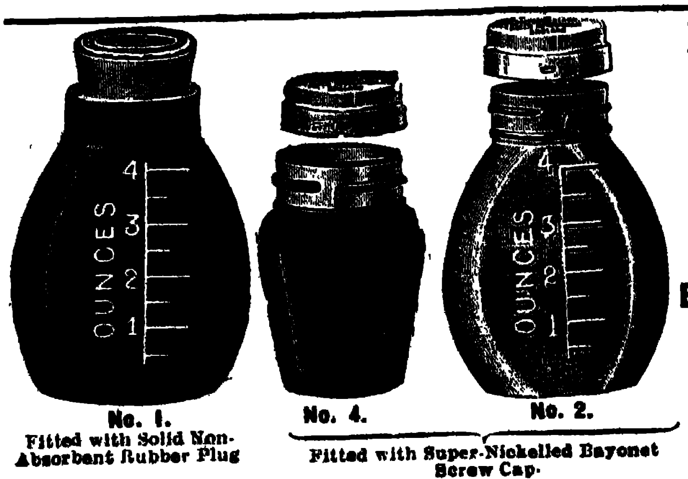

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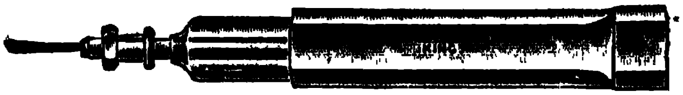

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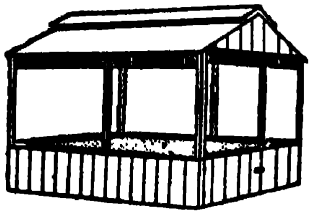

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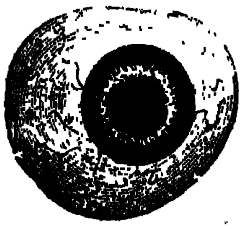

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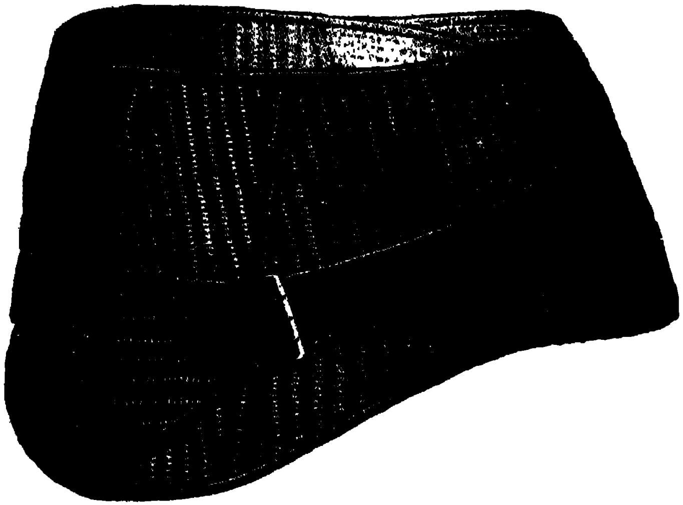

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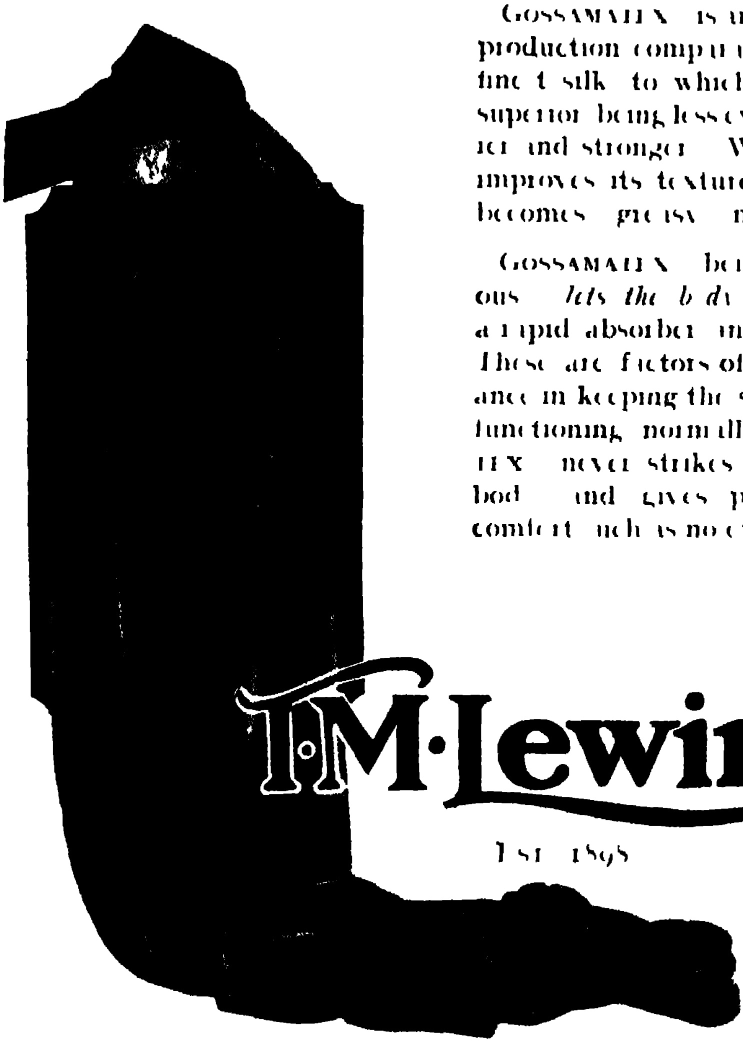

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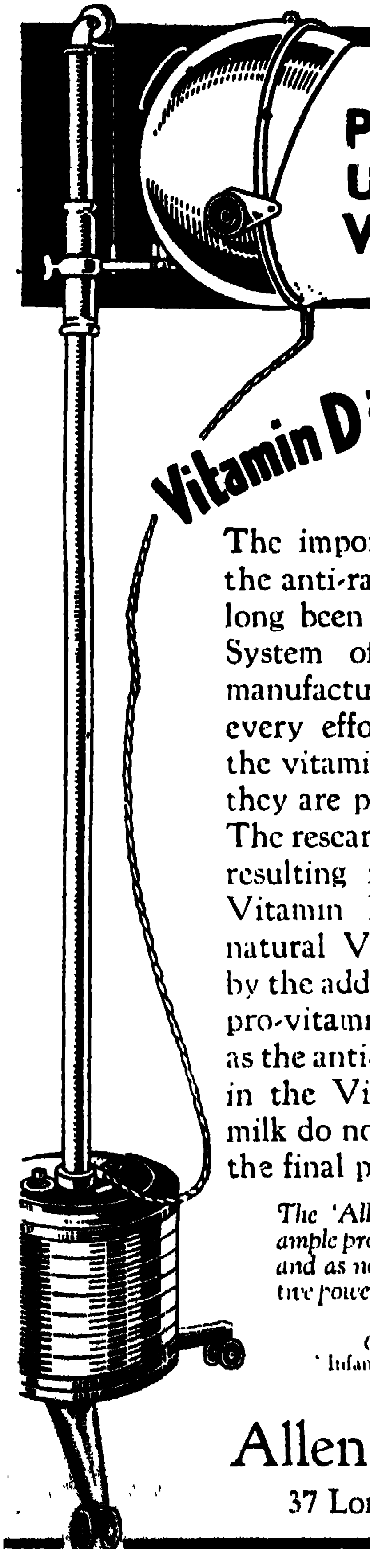

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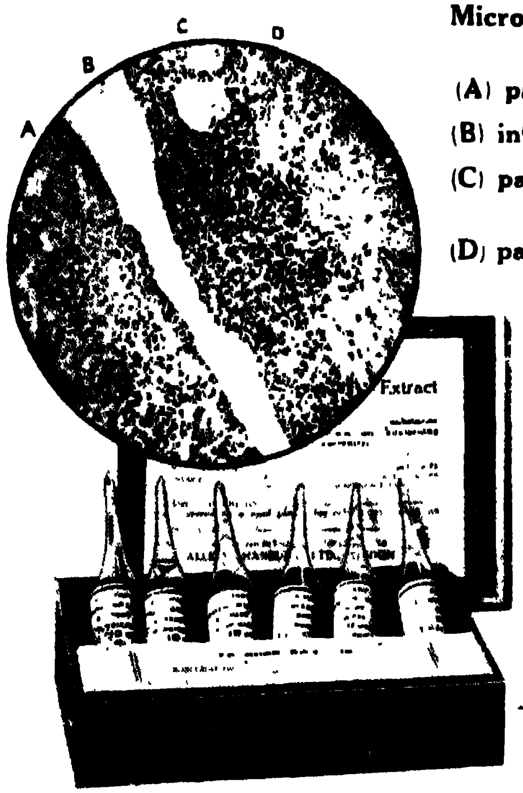

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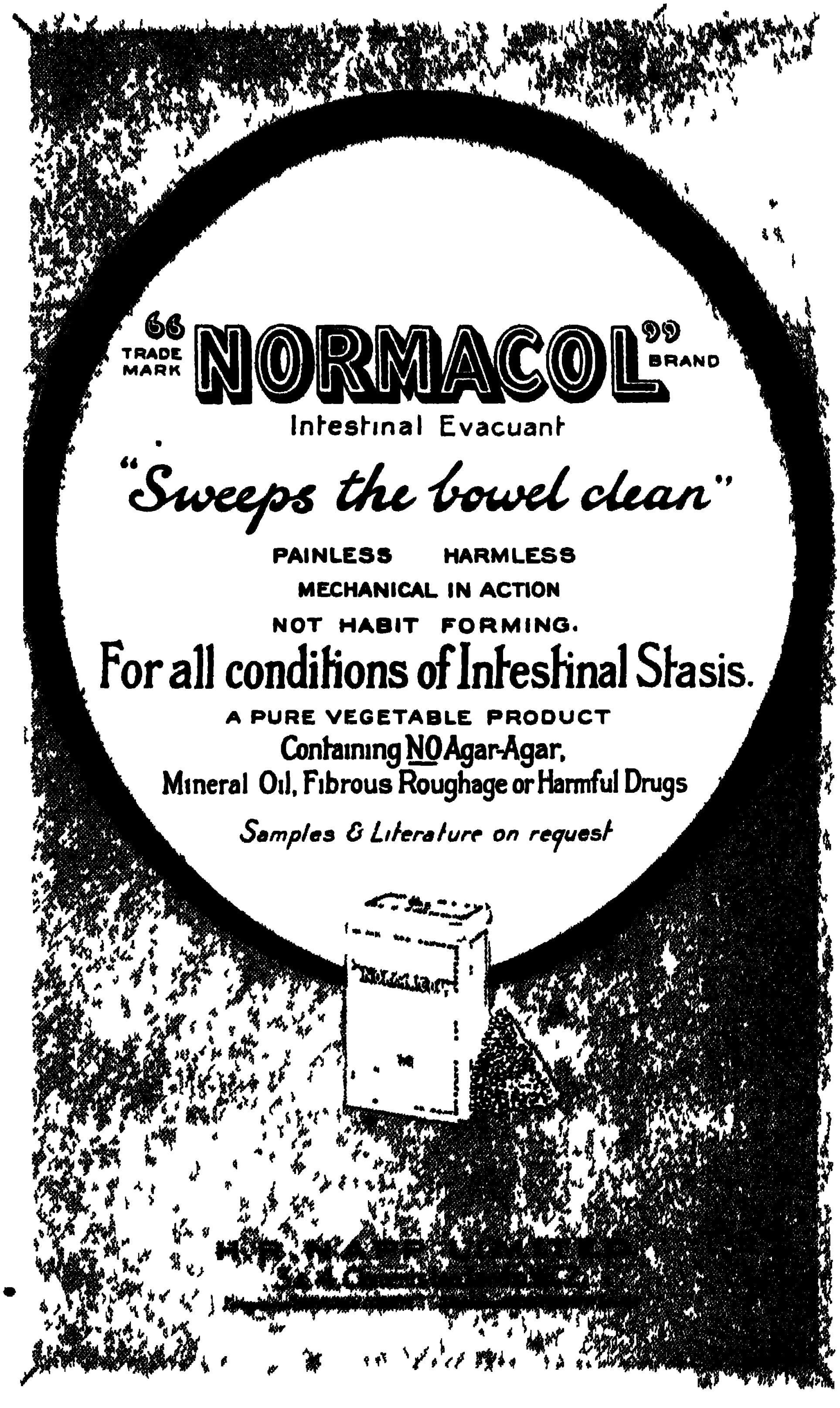

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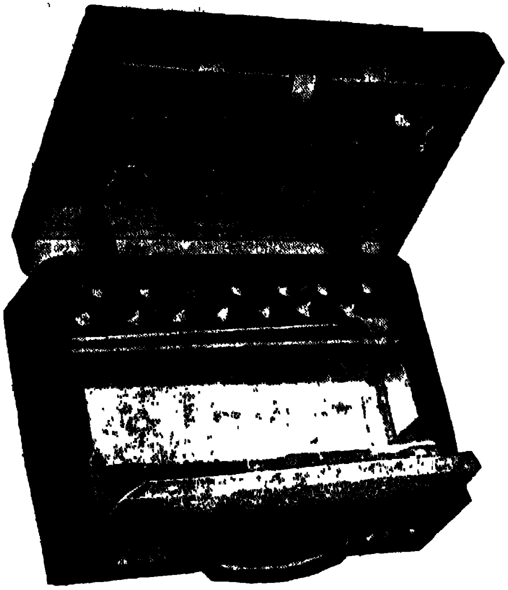

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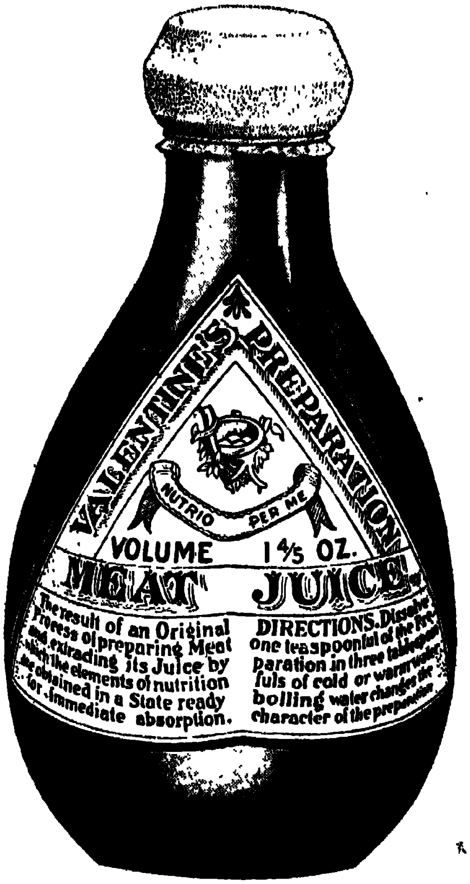
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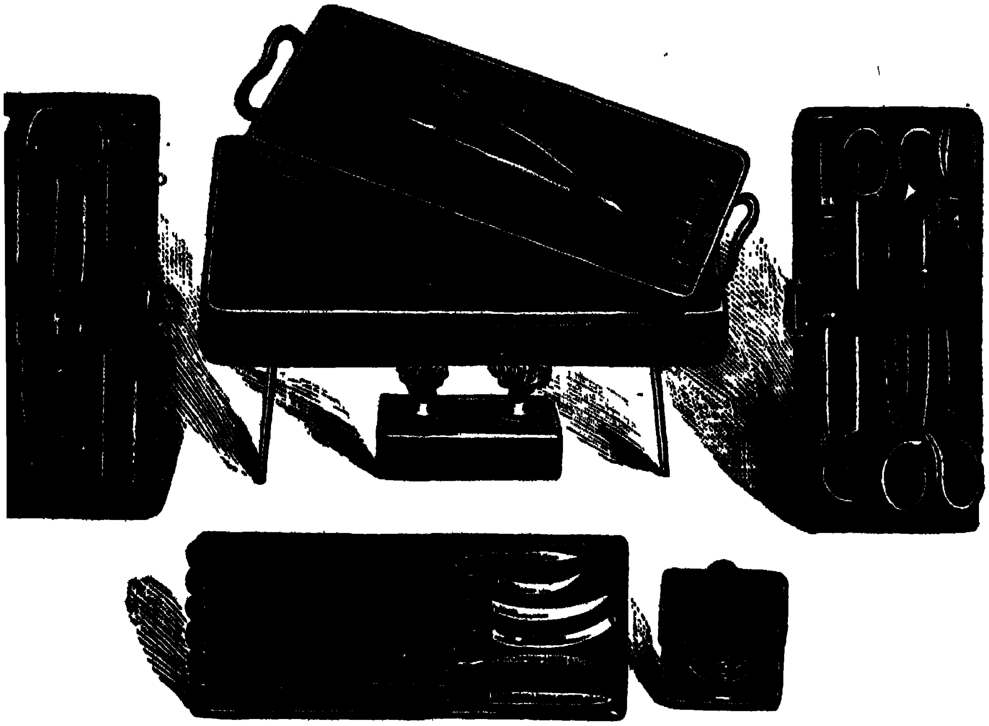

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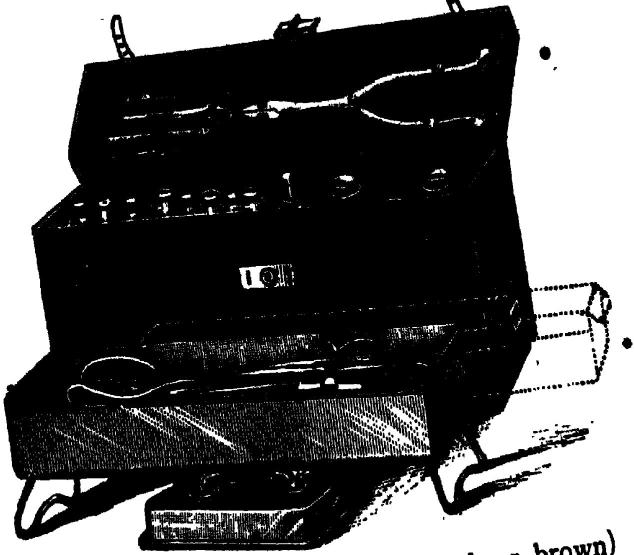

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An outside Canvas Cover can be supplied at 15/9 extra.

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**Prepared under the direction of
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THESE are presented to the practitioner as fulfilling his requirements for Vaccine treatment, not only in the more generally recognised pyogenic infections, but also in the treatment of the complex cases showing symptoms of acute, chronic and sometimes indefinite infection.

The principal uses of the Vaccines of this Series are readily found in the *Clinical Index* given in the brochure published by us. All except two are issued in "ordinary" and in "detoxicated" form; these two exceptions are Pneumococcal Vaccine, which is issued in detoxicated form only, and Whooping Cough Vaccine, which is partially detoxicated. The detoxicated vaccines are particularly designed for the treatment of acute cases during the period of actual infection, for debilitated and elderly subjects and for those who show abnormal sensitiveness to ordinary vaccines.

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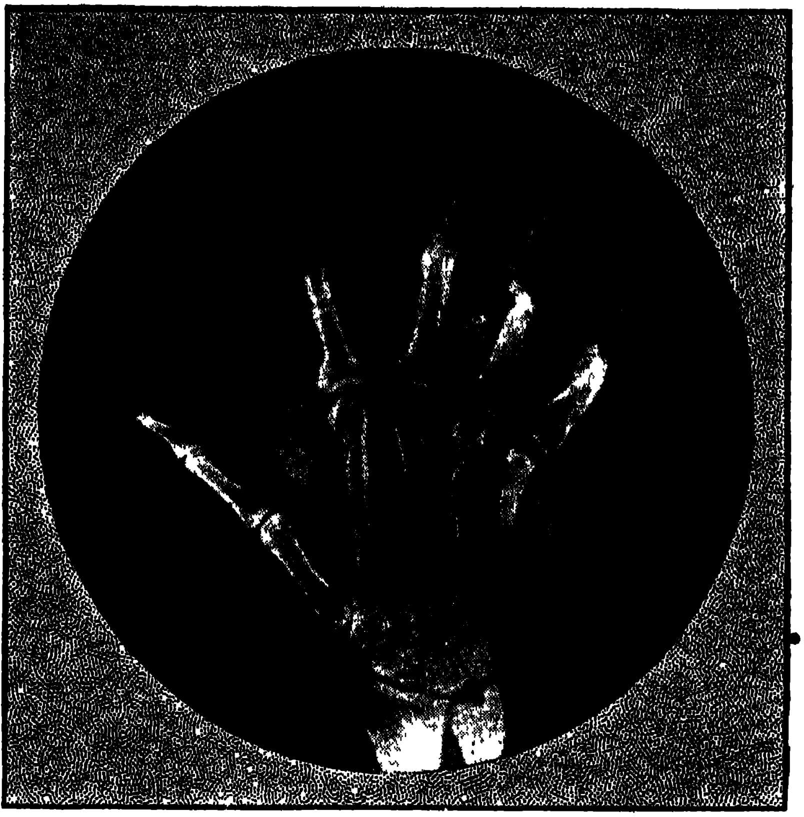

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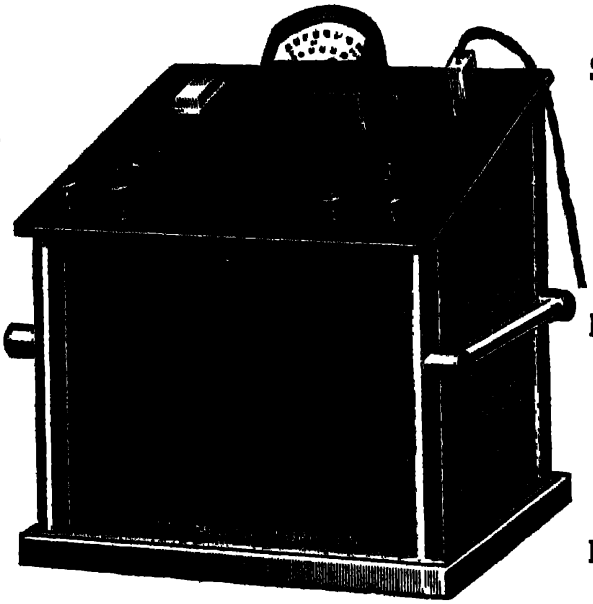

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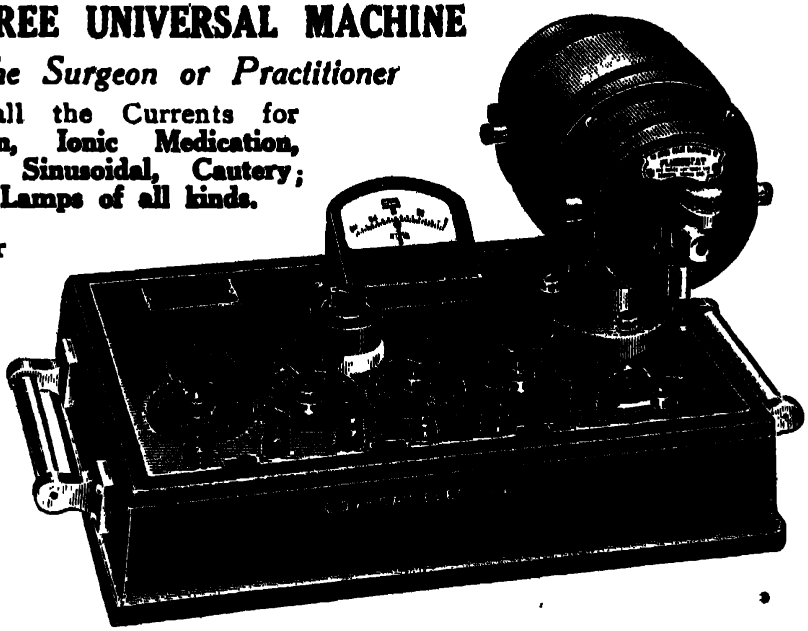

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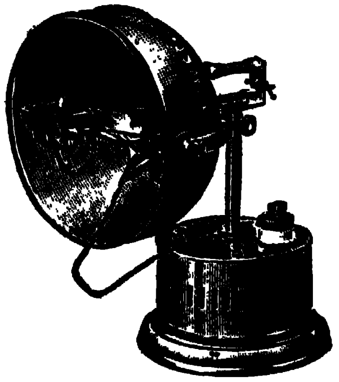

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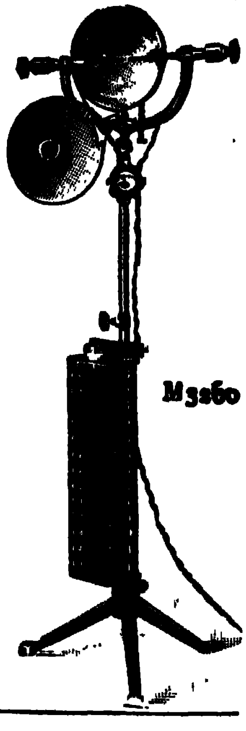

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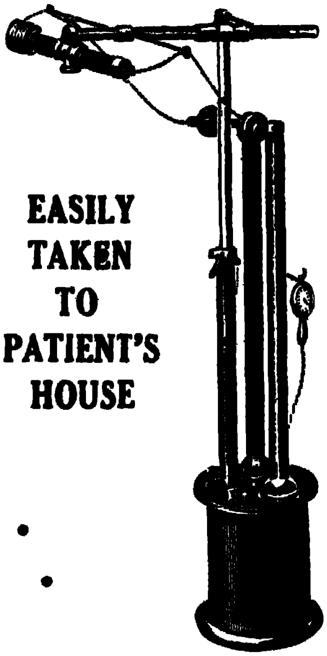

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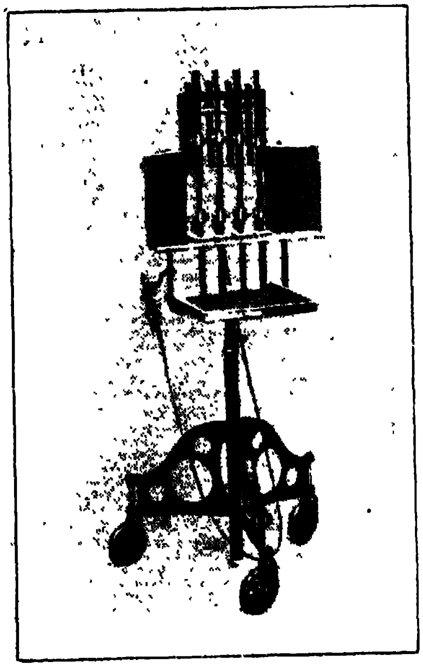

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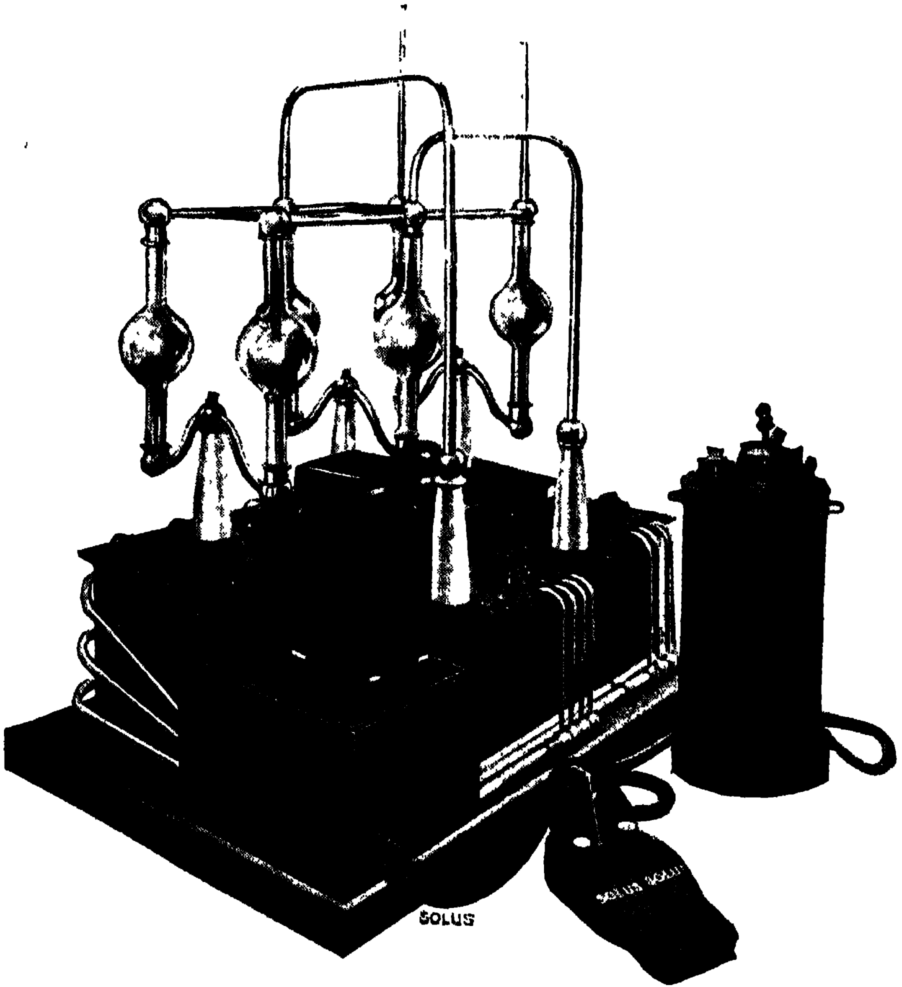

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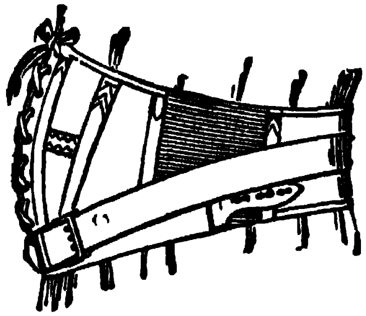

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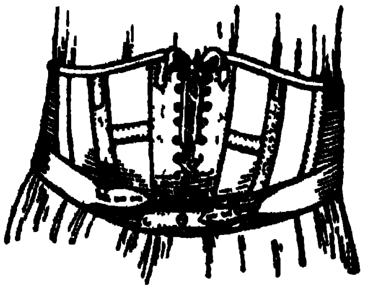

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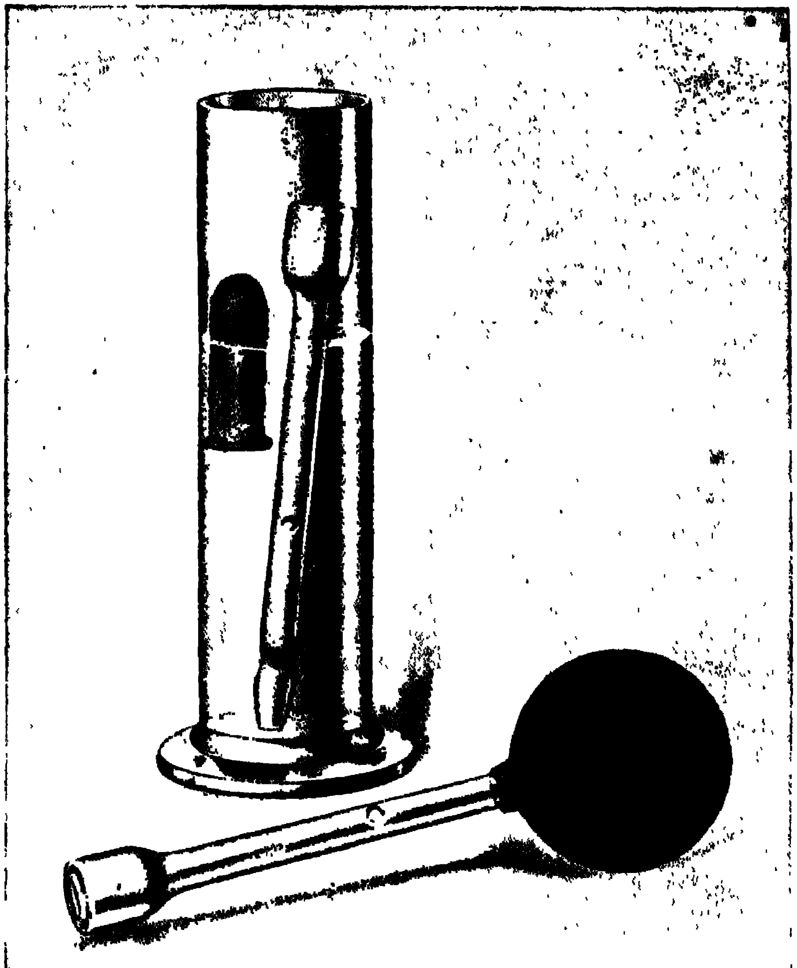

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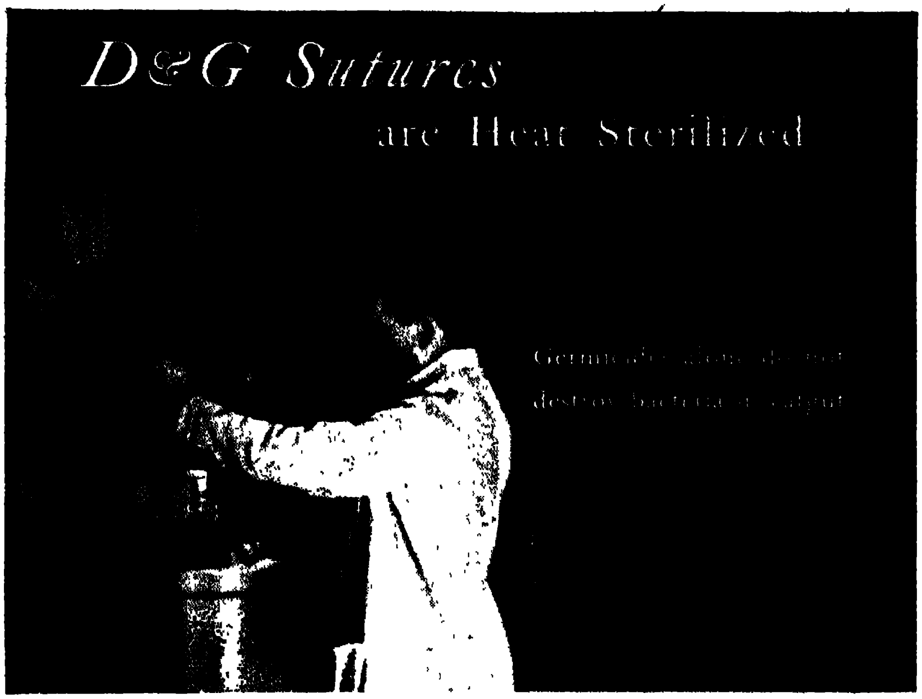

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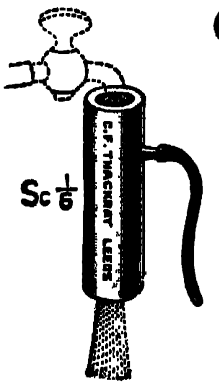

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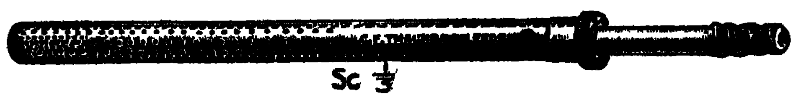

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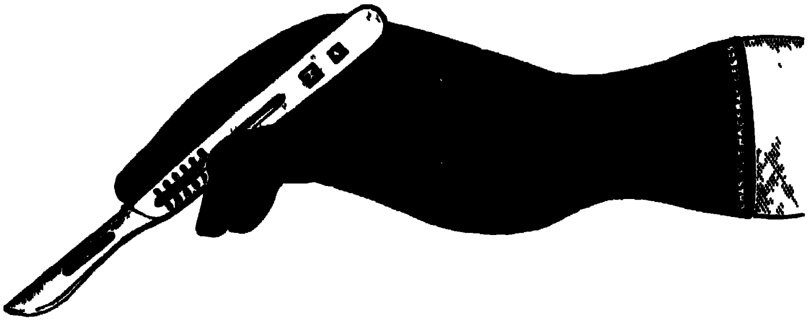

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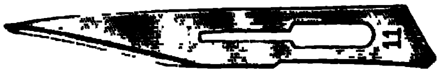

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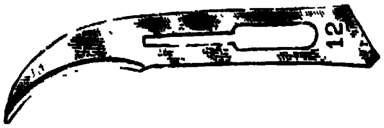

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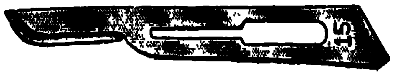

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Nos. 10, 11, 12, 15 *Blades fit Handles*
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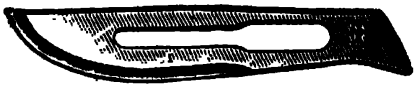

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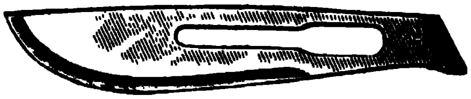

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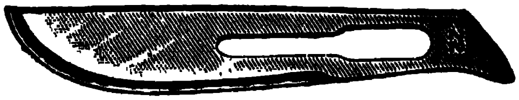

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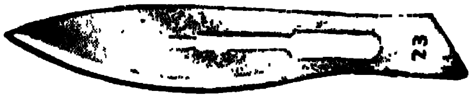

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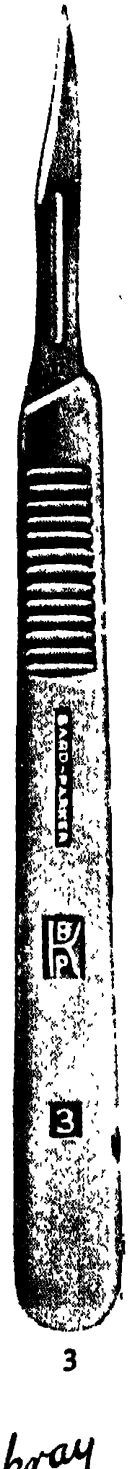

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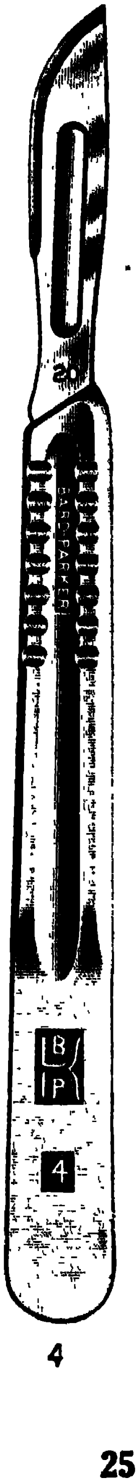

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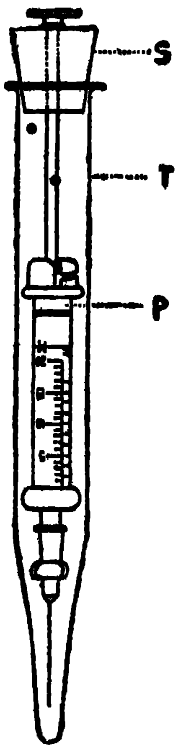

The metal piston *P* is arranged fully extended to prevent the solution getting behind the piston and spilling when the syringe is taken from the tube.

The solution in the barrel of the syringe is forced through the needle back into the glass tube.

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The syringe is all ready for use in a sterile condition.

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It is British made throughout.

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The base is hard natural wood.

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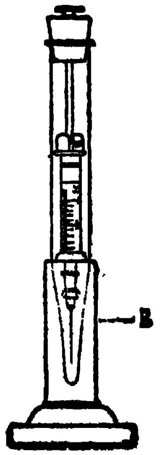

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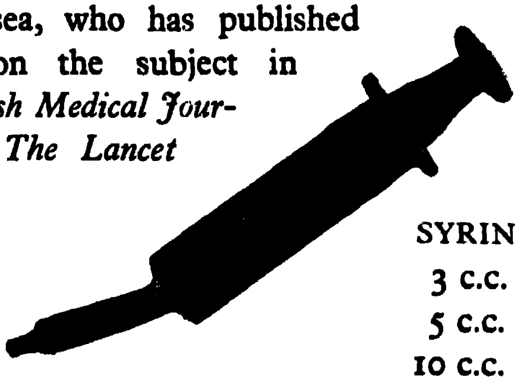
The disadvantages of using an ordinary syringe for the purpose of injecting sclerosing media into varicose veins are overcome by a new type of syringe of a pattern suggested by Mr. C. J. Cellan-Jones, F.R.C.S., of Swansea, who has published articles on the subject in *The British Medical Journal* and *The Lancet*



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3 c.c.	6/6 each	10 c.c.	10/- each
5 c.c.	8/3 „	20 c.c.	12/- „

Full details are given in 'The Editor's Notes,' page 560

A copy of "The Treatment of Varicose Veins by the Injection of Sclerosing Media," by Mr. C. J. Cellan-Jones, M.D., F.R.C.S., sent free on application

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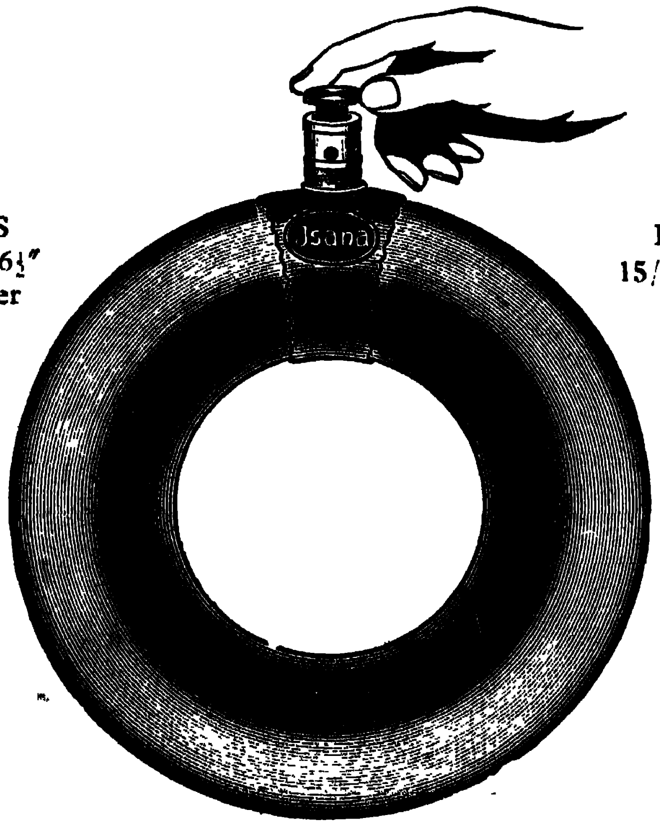

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15″ and 16½″
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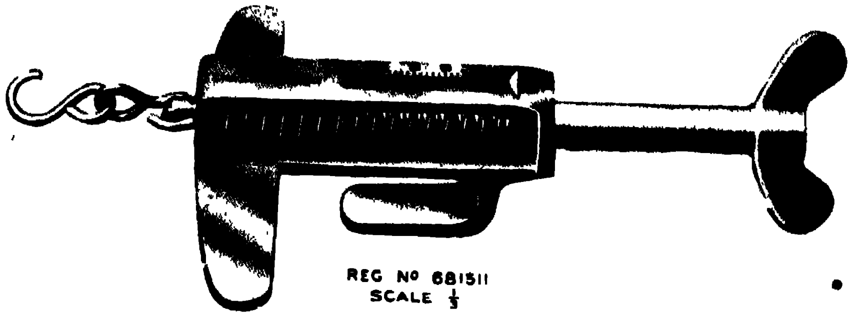
Extension Appliance

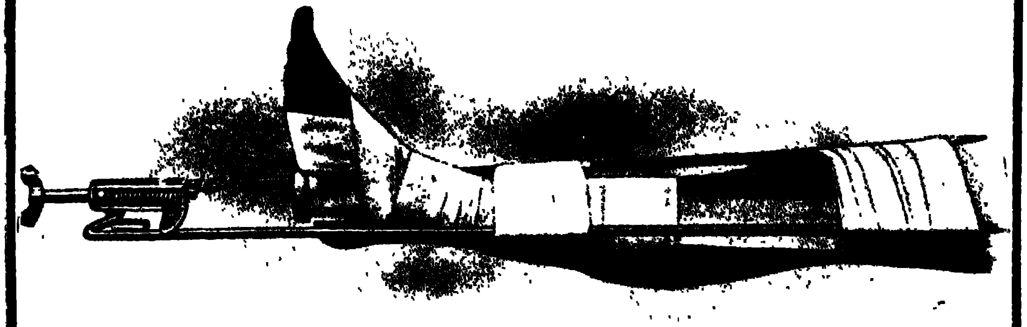
(Suggested by Mr. RUFUS HARRIS, late Assistant Surgeon, Gloucester Royal Infirmary).

For use with Jones Knee or Arm Splint, or any modification.

Obviates the use of any weights, pulleys, or uprights, and does not pin down the patient when extension is applied to a limb.

Particularly useful in the transportation of cases of Fractured Femur.





THE Bandaging in the illustration is arranged to show the limb with the extension applied to a Jones Knee Splint. An ordinary stirrup of webbing, with wooden block and loop of strong cord passing through two holes, is first applied to the limb by means of strapping. The loop of cord is then attached, with tension, to the chain or hook of extension rod. The appliance is held in position by the wings resting across, and the flange fitting over the end of the splint. The amount of tension applied is registered up to 25 pounds by the indicator on the scale and controlled by Thumb Screw and Spring. Price, complete with wooden block, stirrup and instructions for use:

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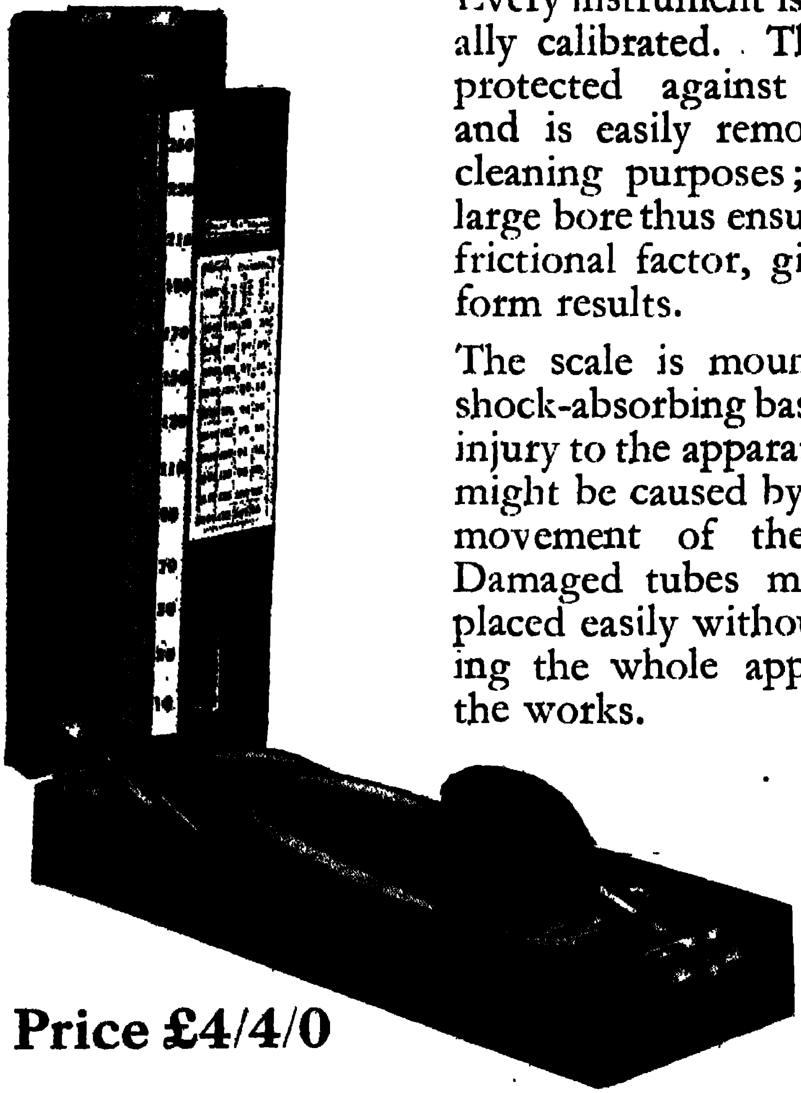
Steady in action, consistent in results, clear to read, no air pockets, absolute accuracy, and ready for instant use.



Every instrument is individually calibrated. The tube is protected against breakage and is easily removable for cleaning purposes; it has a large bore thus ensuring a low frictional factor, giving uniform results.

The scale is mounted on a shock-absorbing base to avoid injury to the apparatus, which might be caused by a sudden movement of the patient. Damaged tubes may be replaced easily without returning the whole apparatus to the works.

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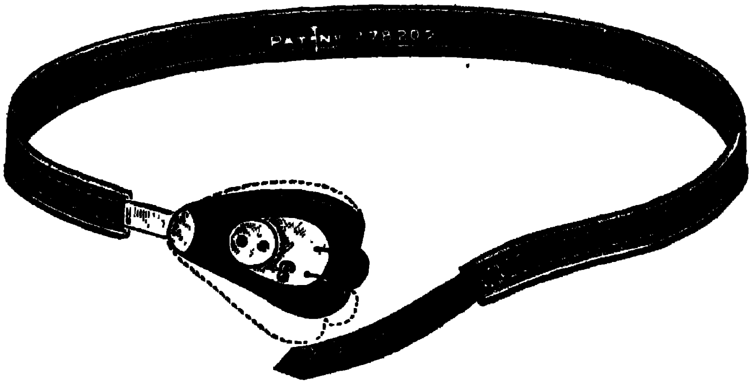

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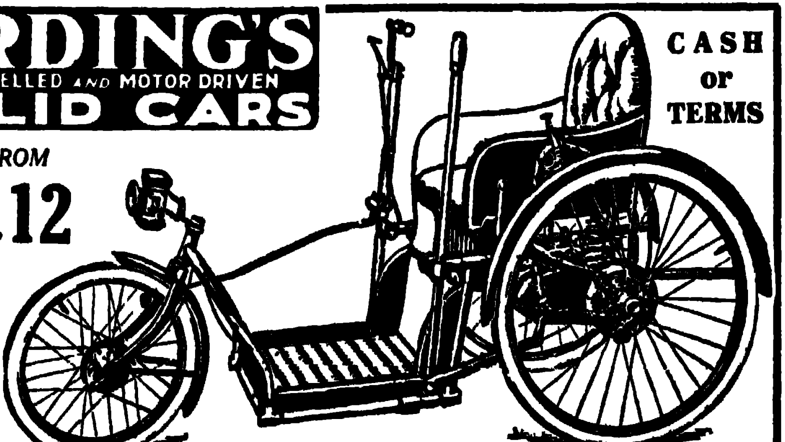

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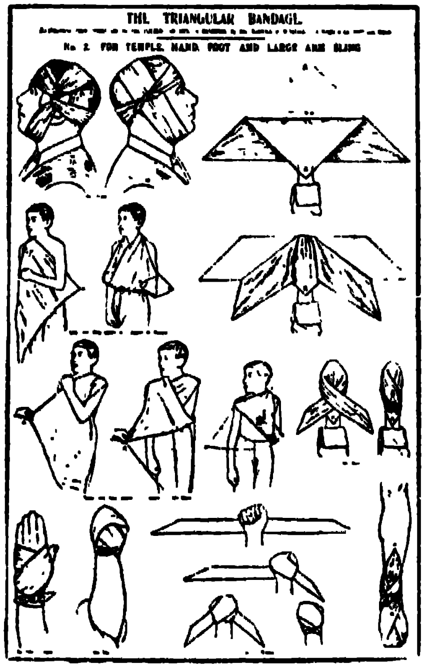

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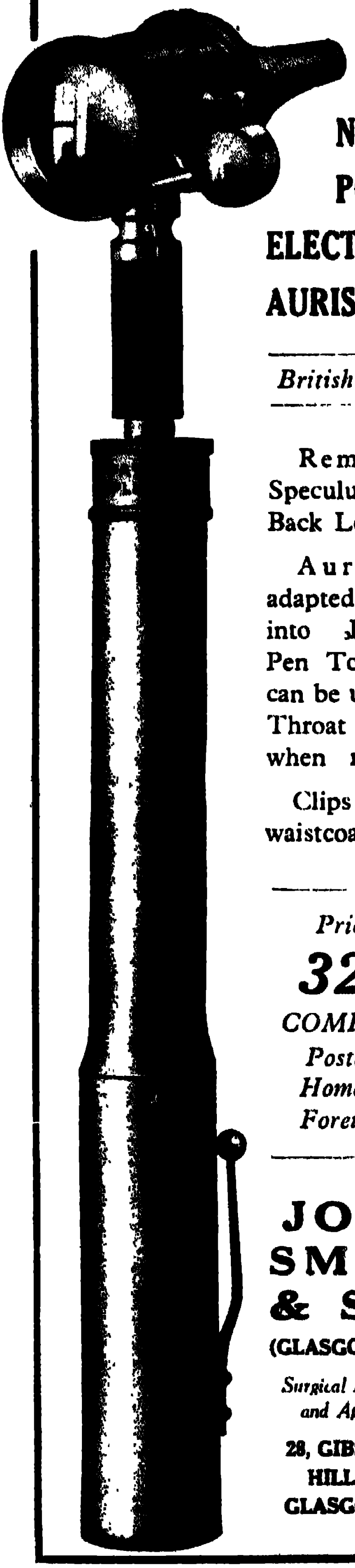

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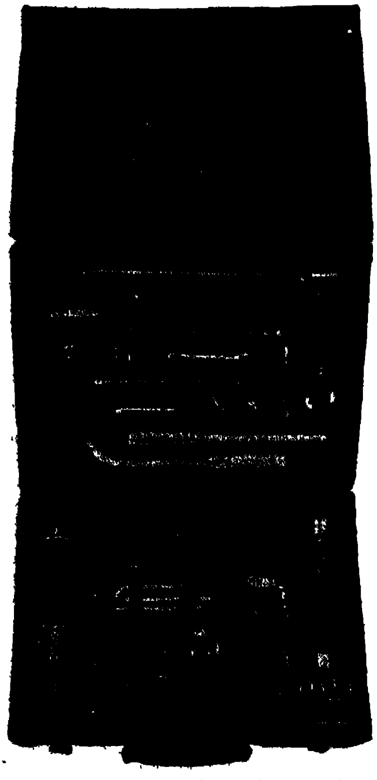

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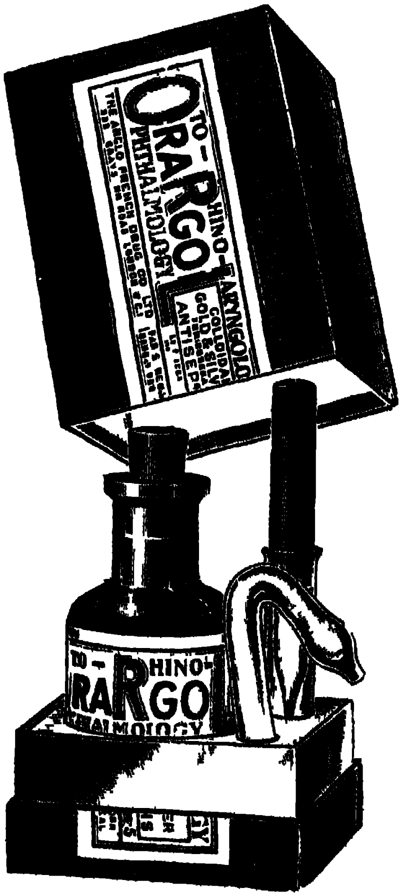

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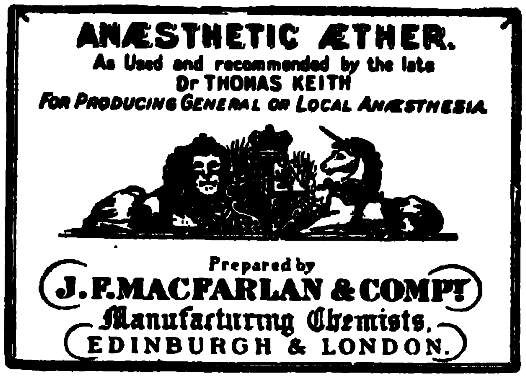

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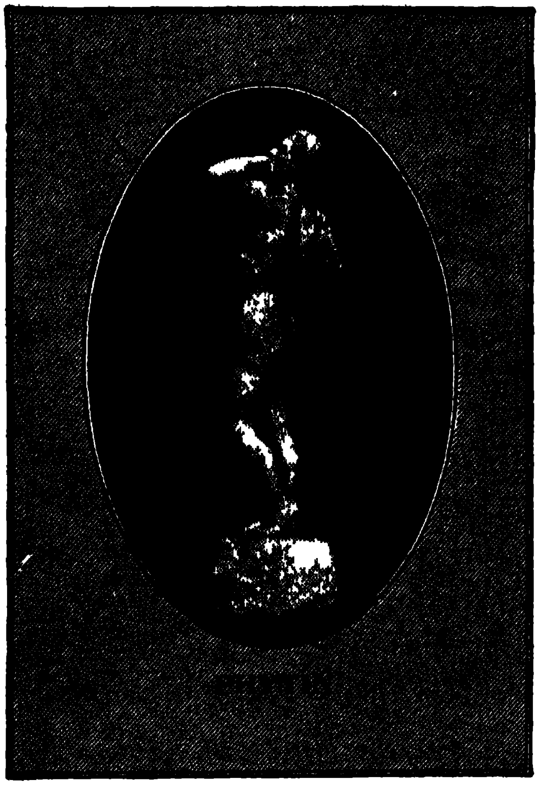

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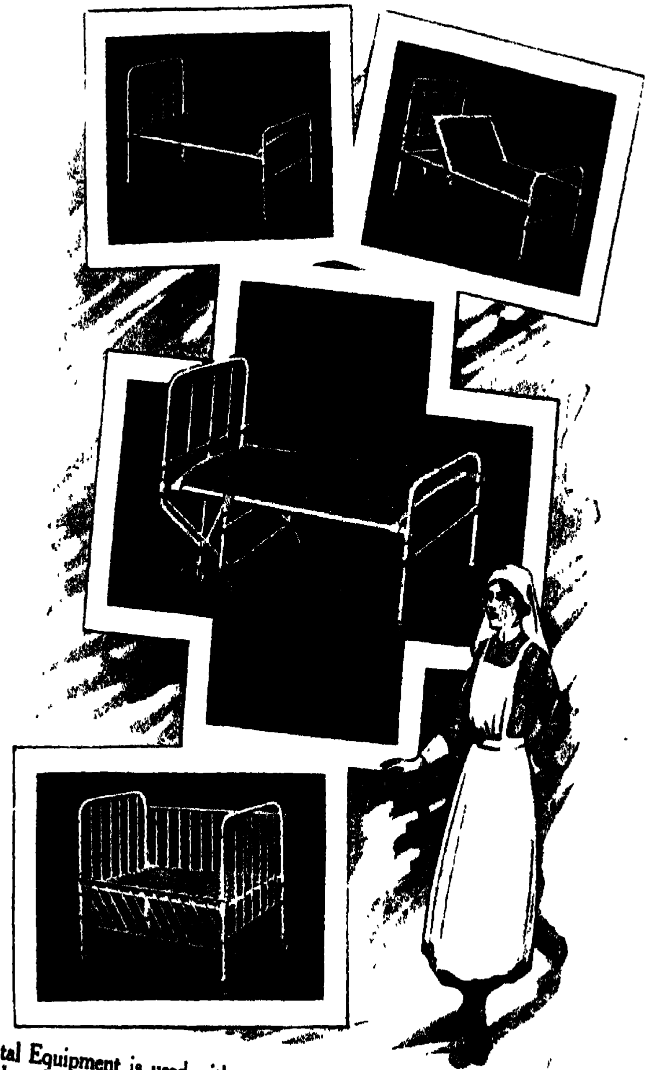

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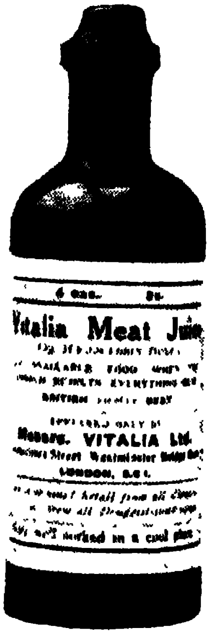

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